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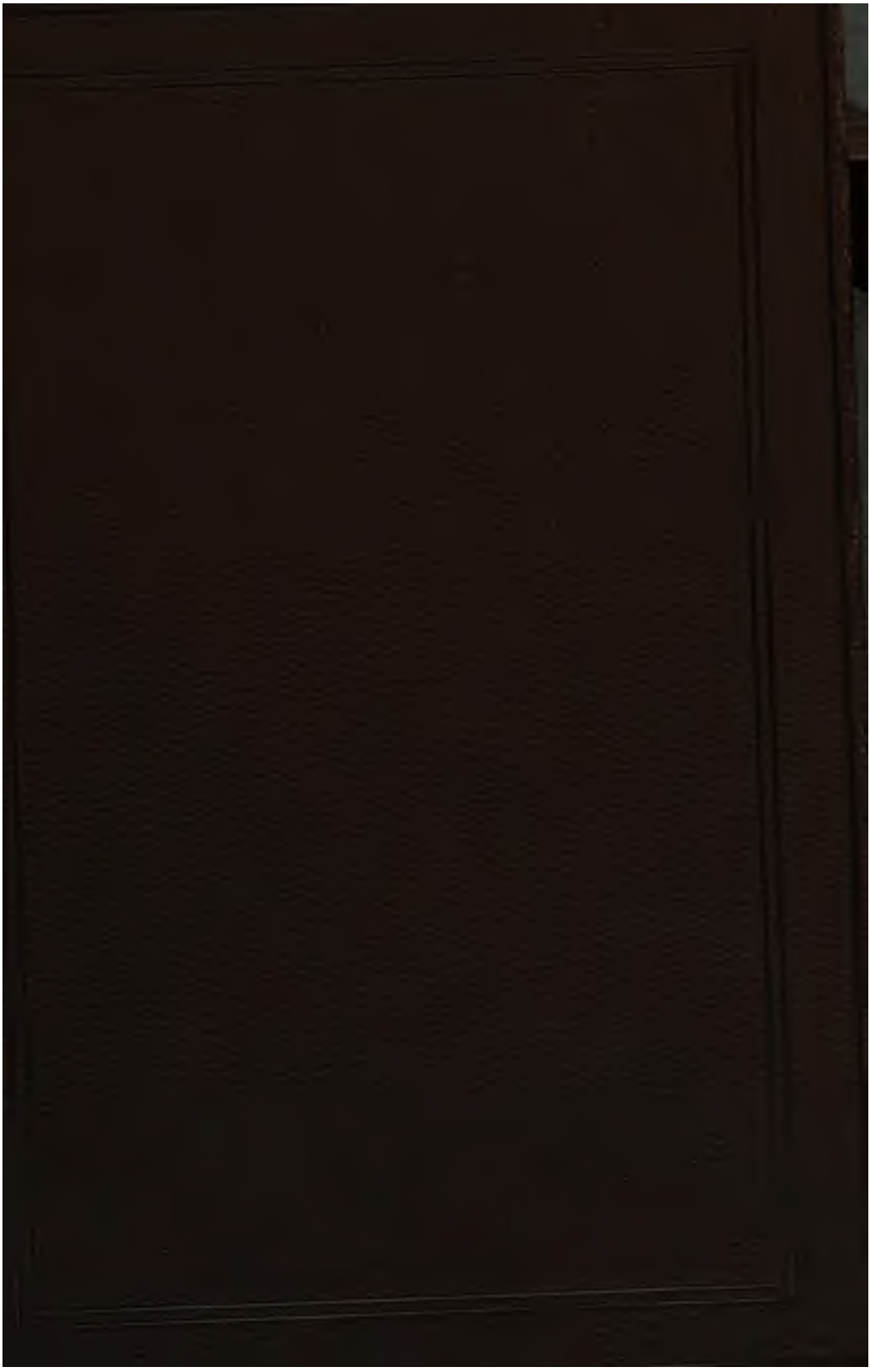
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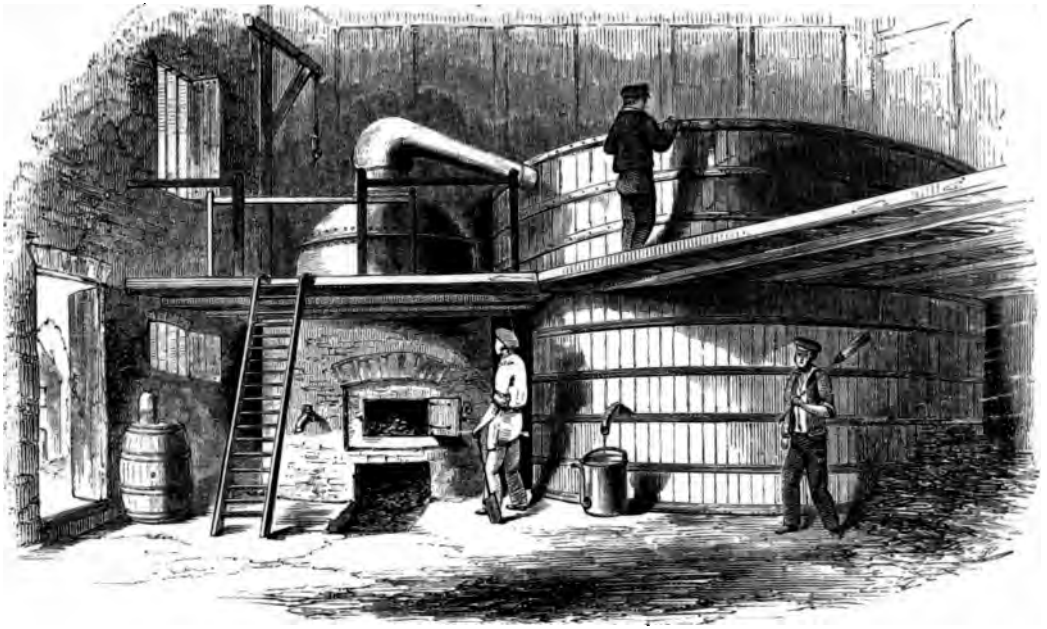
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PERFUMERY

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PIESSE AND LUBIN'S LAVENDER STILL AT MITCHAM, SURREY.

THE ART OF

PERFUMERY

AND THE METHODS OF OBTAINING THE

ODOURS OF PLANTS

THE GROWTH AND GENERAL

FLOWER FARM SYSTEM

OF RAISING FRAGRANT HERBS

WITH INSTRUCTIONS FOR THE MANUFACTURE OF PERFUMES FOR THE HANDKERCHIEF, SCENTED POWDERS, ODOROUS VINEGARS AND SALTS, SNUFF, DENTIFRICES, COSMETICS, PERFUMED SOAP, ETC.

To which is added an Appendix on

PREPARING ARTIFICIAL FRUIT-ESSENCES &c.

BY

G. W. SEPTIMUS PIESSE, PH.D., F.C.S.

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AUTHOR OF

'CHEMICAL, NATURAL, AND PHYSICAL MAGIC' 'THE LABORATORY OF CHEMICAL WONDERS' ETC.

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PERFUMERY

ment consists in knowing how to enjoy the faculties which we possess, then must we learn not only how to appreciate the harmony of colour and form, in order to please the sight ; the melody of sweet sounds, to delight the ear ; the comfort of appropriate fabrics, to cover the body, and to please the touch ; but the smelling faculty must be shown how to gratify itself with the odoriferous products of the garden and the forest.

Pathologically considered, the use of perfumes is in the highest degree prophylactic ; the refreshing feeling imparted by the citrine odours to an invalid is well known. The occasional sacrifice of incense in the fever chamber will prevent infection. The odours of plants are all antiseptic.

The commercial value of flowers is of no mean importance to the wealth of nations. But, vast as is the consumption of perfumes by the people under the rule of the British Empire, little has been done in England, either at home or in her tropical colonies, towards the establishment of flower-farms, or the production of the raw odorous substances in demand by the manufacturing perfumers of Britain ; consequently, nearly the whole are the produce of foreign countries.

The climate of some of the British colonies especially fits them for the production of odours from flowers that require elevated temperature to bring them to perfection.

But for the lamented death of Mr. Charles Piesse,[1] Colonial Secretary for Western Australia, flower-farms would doubtless have been established in that colony long ere the publication of this work. Though thus personally frustrated in adapting a new and useful description of labour to British enterprise, I am no less sanguine of the final results in other hands.

Horticulturists being generally unacquainted with the

[1] Brother of the Author.

methods of economising the scents from the flowers they cultivate, entirely lose what would otherwise be a profitable source of income. For many ages the Cornish miners, while working the tin streams, threw the copper ore over the cliffs into the sea. How much wealth was thus cast away by ignorance, we know not; but there is a perfect parallel between the old miners and the modern gardeners.

For more than a century prior to the Victorian era, perfumes were out of favour in England; the people were of the idea of Socrates, who objected to the use of perfumery altogether. In these modern days, however, civilisation has revived, and there is restored with it one of its concomitants. It is mentioned in 'Chambers's Cyclopædia,' published in 1740, that perfumes were disused here (in England), but were *à la mode* in Italy and Spain.

In 1822, the first book devoted to this subject appeared in our language; it was the work of Charles Lilly, edited by Colvin Mackenzie. Mr. Lilly is described as 'that celebrated perfumer at the corner of Beaufort Buildings, in the Strand,' and who was spoken of in the *Spectator*, *Tatler*, and *Guardian*. Now, judging this work to represent the knowledge of the art of perfumery in this country at that period, it must be admitted that it was very imperfect: a century of neglect had done its work, and the art had been lost.

Five-and-twenty years elapsed, and the whole commerce of England began to show considerable vitality. The founding of the Australian colonies, the discovery of gold in California and in Australia, the introduction of railways, the application of steam to shipping, and other causes, has produced a great increase in our commerce. Amongst other things the export of perfumery has increased.

In Italy, Sardinia, Sicily, and Southern France, some half-dozen flowers—jasmine, rose, acacia, orange, bergamot, tubereuse, and violet—are extensively grown for perfumery, and are now easily imported for manufacture into England. Tropical produce, together with musk, ambergris, castor, and other raw materials for the perfumer's laboratory, comes to the British market before it reaches Continental cities. There is, therefore, no natural reason why the perfumery trade should not take the highest position in this country: even if it does not exceed that of Germany and France, it might at least equal it.

The excise duty on spirits of wine, however, prevents England from fairly competing in her own colonies with her German and French neighbours in this particular trade. The spirit used by the perfumery factors of England pays twelve shillings per gallon duty; this three hundred per cent. on the value of the raw material checks the art of perfumery. Till recently there was an excise duty on paper, which did not exist on the Continent; all sorts of ornamental card boxes for packing were employed there, giving elegance and neatness to the goods, which in England it was vain to attempt with excised paper. In like manner there was an excise duty on soap. Refined scented soap was only known as a luxury, and of course this was a check to the perfumery trade. When this excise was removed, perfumers immediately sent large quantities of scented soap into the market, and it has now come into ordinary use.

Recently France has reduced the import duty on soap from 174*f.* to 6*f.* the 100 kilogrammes. Portugal has been equally wise: English perfumers are already in these markets. A great impetus was given to the perfumery trade by the

removal of the excise duty on glass. France used to ship all her perfumery in stoppered bottles, but England had to be content with a cork. It was well known that scented spirit could not be preserved very well in a corked bottle; and essences sent from England to Calcutta, in the old corked bottles, suffered ten per cent. ullage. Prior to the removal of the excise on glass, 2-oz. stoppered bottles were costing *6s. 3d.* per dozen; but now they are to be had for *2s. 6d.*, to the great benefit of the perfumery trade.

Transparent soap was the invention of an Englishman; yet he is still prevented from reaping the benefit of his valuable invention by the excise duty on the spirit which is necessary for its manufacture. The consequence is that German and American transparent soap is imported into England to the detriment of our trade. I do not view these excise duties on trade products as affecting the individual manufacturer, because it is admitted that the individual must suffer for the multitude; but in consequence of these excise duties the source of revenue (commerce) is withered in the germ. It is true that under 'certain regulations' perfumers can 'export' scented spirit free from duty; but the expenses incurred in doing so are so great that they all but equal the benefit derived.

So long as 'bonded' warehouses are used, all the manufacturing perfumers renting them should be housed together in one block or building in order to facilitate the work of the gauger, locker, clearing agent, and other functionaries; also to enable the various laboratories to be supplied with steam heat; for without such aid, during four months of our year, but little and very unsatisfactory work within the docks now so used can be done. The cold there congeals the otto of roses,

and renders turbid many essences. Again, the workmen employed in 'capping' bottles are also much delayed by the cold, and suffer in health.

Female labour, so useful in this business, is prohibited by present regulations within 'bonded' warehouses. The workmen are also injured in the matter of their wages, as at present the *regulations* are—'no man is allowed to work after 4 o'clock;' the dock gates then close. Thus, for about eight months in the year, every man has to idle his time for at least three hours daily. These things, fairly considered, are a hard 'set-off' against the English manufacturing perfumers compared with the facilities given by the French Government to the same trade.

I am pained to say that, for want of a generous unity among the English perfumery merchants, there has been hitherto no concerted action, by deputation or otherwise, in making their especial grievances known to the Board of Trade. The *Times* truly observed: 'There certainly never was a time when it was more imperative that trade and handicrafts should be free from all restraint.'

Still the English perfumery trade is rapidly advancing, and finding favour from Brazil to New York, from Australia to India and Russia. I think I am justified in saying that this favour is not ill bestowed, for England now produces the finest perfumery in the world.

If this work has contributed in any measure to raise the manufacture of perfumery in England to its present mercantile importance, my labours have not been in vain; and I am happy in thus adding to the industrial resources of my country.

The exportation of perfumery has exactly doubled in

value since the date of the first edition of this work; and this, too, in spite of the almost prohibitory tariff levied by our Indian Government, and the cessation of trade with the two Americas.

To my German translator, to my two American reprinters, and to my French and Italian translators, I commend the present edition.

G. W. SEPTIMUS PIESSE.

2 NEW BOND STREET, LONDON, W.
October 1879.

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THE ART OF PERFUMERY.

INTRODUCTION AND HISTORY.

SECTION I.

By Nature's swift and secret working hand
The garden glows, and fills the liberal air
With lavish odours.
There let me draw
Ethereal soul, there drink reviving gales,
Profusely breathing from the spicy groves
And vales of fragrance.—THOMSON.

THE hand of the Creator has lavished upon flowers all the resources of its infinite skill. Set upon stems perfect in grace and delicacy, painted in the brightest, most diversified, and most harmonious colours, and impregnated with the most exquisite fragrance, flowers occupy an important place in the system of nature.

Among the numerous gratifications derived from their cultivation, that of rearing them for the sake of their perfumes stands pre-eminent. It is proved, from the oldest records, that perfumes have been in use from the earliest periods. The origin of this, like that of many other arts, is lost in the

depth of its antiquity; though it had its rise, no doubt, in religious observances. Among the nations of antiquity, an offering of perfumes was regarded as a token of the most profound respect and homage. Incense, or Frankincense which exudes by incision and dries as a gum, from *Arbor thurifera*, was formerly burned in the temples of all religions, in honour of the divinities that were there adored. The granite tablet attached to the breast of the Great Sphinx of Egypt (the top of which may still be seen above the sand) formed the end of a sanctuary, and on it King Thothmes IV. is represented offering on one side incense, on the other a libation of oil or ointment. Many of the primitive Christians were put to death because they would not offer incense to idols.

The origin of perfumery Pliny traces to the East; and his opinion is fully borne out by the inspired writers, whose frequent allusions to perfumes and aromatics prove the very early and extensive employment of the luxury by nations in whose land flourish the aloe, cinnamon, sandal wood, camphor, nutmeg, and cloves; the incense tree which it was the sacred privilege of the Sabæi to gather, the balsam trees, the sorrowful nyctenthes which pours forth its rich odours in the twilight, the Nilica in whose blossoms the bees are said to hum themselves to sleep, and the sweet Elcaya;—these, and a forest of others, are the property of the East, and for ages were disregarded by the rest of the world. Among the Chinese, whose sensualism is so refined, says M. Claye, perfumes are largely employed in their worship, their pleasures, and their domestic pursuits. Odorous woods and resins are burnt before their altars and mixed with their viands. The disciples of Zoroaster used to offer their prayers before altars on which the sacred fire was kindled, and five times a day the priests laid on it wood and perfumes. In Greek mythology the invention and use of perfumes is attributed to the Immortals; and, according to the fables, men derived their knowledge of them from the indiscretion of Æone, one of the nymphs of Venus. Homer speaks of perfumes in connection with the divinities. Whenever the Olympian gods honoured a mortal with their visits, they left behind them an ambrosial odour, an unequivocal token of their divine nature. The practice of anointing the bodies of the dead was not confined to the Jews; all the nations of antiquity appear to have practised the same ceremonial. Thus we read in Homer,[1] that

[1] *Iliad*, xxiii. 185, sq.

'Venus, night and day,
Daughter of Jove, . . .
All the corpse o'erlaid with roseate oil,
Ambrosial.'

The Greeks, moreover, were much addicted to perfumes, and the art of the perfumer was remarkably advanced among them. They carried their affectation to such a length as to keep their clothes in scented chests, as we learn from Homer in reference to Ulysses. And, according to Athenæus, they made use of scent-bags for sweetening the air as they sat at table. Like the Romans, they were accustomed to crown themselves with roses at their feasts, and the most esteemed wines of the Athenians were perfumed with violets, roses, and other aromatics. The wine of Byblos in Phœnicia was especially remarkable in this respect. Solon attempted by one of his laws to restrain the excessive indulgence. Among the Lacedæmonians, the luxury was always discountenanced, and perfumers were expelled the city as wasters of oil, upon the same principle that they dismissed all who dyed wool because they destroyed its whiteness. In Athens the case was different: in spite of Solon's prohibition a taste for perfumery grew apace, and its indulgence was brought to a higher pitch of refinement than it has ever enjoyed before or since. Though the East supplied the Athenians with the most valued gums and ointments, they added largely to the stock of fragrant plants already in use. Apollonius, of Herophila, wrote a treatise on perfume:—'The iris,' he says, 'is best at Elis, and at Cyzicus; perfume from roses is most excellent at Phasalis, Naples, and Capua; that made from crocuses is in highest perfection at Soli, in Cilicia, and at Rhodes; the essence of spikenard is best at Tanius; the extract of vine-leaves at Cyprus, and at Adramyttium; the best perfume from marjoram, and from apples comes from Cos; Egypt bears the palm for its essence of Cyprinus, and the next best is the Cyprian and Phœnician, and after them comes the Sidonian; the perfume called Panathenaicum is made at Athens; and those called Metopian and Mendesian are prepared with the greatest skill in Egypt.' Still the superior excellence of each perfume is owing to the purveyors, and the materials, and the artists, and not to the place itself.

The boxes in which the unguents were carried were generally made of alabaster, highly ornamented, and must have formed an expensive item in the jeweller's bill. Vases of onyx were also in use. But if we may believe a passage in the 'Settler' of Alexis,[1] even this extravagance has been exceeded.

'For he t' anoint himself
Dipped not his finger into alabaster,

[1] A Greek comic poet, flourished about B.C. 350.

The vulgar practice of a former age;
But he let fly four doves, with unguents drenched,
Not of one sort, but every bird a perfume bore
Peculiar, and differing from the rest;
And they hov'ring around us, from their heavy wings
Showered their sweets upon our robes and furniture.
And I—be not too envious, gentlemen,—
I was myself bedewed with violet odours!'

The room in which an entertainment was given was always perfumed, either by burning incense or sprinkling the furniture with scented waters —an unnecessary measure, when we consider the lavish manner in which the guests were anointed. Each portion of the body had its appropriate oil or essence. Mint was recommended for the arms; palm-oil for the jaws and breasts; the eyebrows and hair were anointed with an unguent extracted from marjoram; the knees and neck with the essence of ground ivy. This last was beneficial at drinking parties, as also was the perfume obtained from roses; the quince yielded an essence suitable to the lethargic and dyspeptic; the perfume extracted from vine-leaves kept the mind clear, and that from white violets was good for digestion.

In Greece, the perfumers' shops were open to all comers. They were used as gossiping places, where affairs of State were discussed, fashions decreed, and tales of scandal told. So that it was common at Athens to say, Come to the perfumer's, as at Paris, Come to the café.

The fashion of anointing the head at banquets is said to have arisen from an idea that the heating effects of wine would be better borne when the head was wet, just as a patient who labours under a burning fever is relieved by the application of a lotion. Aristotle proved that his habits of observation had led him to a different and truer conclusion, when he attributed the frequent occurrence of grey hair to the drying nature of the spices employed in the unguents. Nor did he stand alone in condemning their excessive use. It was not without a meaning that Sophocles represented Venus, the goddess of pleasure, perfumed, and looking in a mirror; and Minerva, goddess of intellect and virtue, as using oil and gymnastic exercises. Chrysippus sought in the derivation of the word an objection to the luxury; but the attempt was so far-fetched as fairly to expose him to the satire of an ancient wit, that 'if there were no physicians, there would be nothing in the world so stupid as grammarians.'

Socrates disapproved of all perfumes. 'There is the same smell,' he said, 'in a slave and a gentleman, when both are perfumed;' a remark that made little impression upon his pupil Æschines, who turned perfumer, fell into debt, and attempted to borrow money upon the strength of his business. Alexander the Great was more attentive to the rebuke

of his tutor, Leonidas, for his wasteful expenditure of incense in his sacrifices. 'It would be time for him,' his tutor told him, 'so to worship when he had conquered the countries that produced the frankincense.' The king remembered the lesson; and when he had taken possession of Arabia, he despatched a cargo of frankincense and myrrh to his old tutor.

From Greece perfumes quickly made their way to Rome; and, although their sale was at first strictly prohibited, their employment became more and more extravagant, until even the eagles and standards were thought unfit to face the barbarian hosts of Northern Europe unless they had been duly anointed before battle; and should the engagement have proved successful, the ceremony was repeated. Such was the demand for this luxury, that the chief street of Capua was occupied solely by perfumers. The incense burnt by Nero upon the funeral pyre of his wife Poppæa exceeded the annual production of spices in Arabia. At a rather earlier period, Plautius Plancus, when proscribed by the triumvirs, was betrayed by his perfumes. His place of concealment got wind, and discovered him to his pursuers.[1]

After the Romans had conquered Egypt, India, and Arabia, they obtained from these countries enormous quantities of perfumes, in addition to those produced in Gaul and Italy. The commonest of their perfumes was the sweet-smelling rush. The most highly prized were the roses of Pæstum, spikenard, onegalium, telinum, medebathrum, balm of Gilead, cinnamon, &c. They lavished these perfumes with a senseless prodigality in their baths, their bed-rooms, and their beds. Like the Greeks, they had perfumes for the different parts of the body; they mixed them with their wines, as Gallus sings:—

> Tunc me vina juvent nardo confusa rosisque,
> Sertaque et unguentis, sordior facta coma;

and they applied them to the heads of their guests.

Describing the spectacles and Amphitheatre at Rome, Gibbon[2] observes:—'The air of the Amphitheatre was continually refreshed by the playing of fountains, and profusely impregnated by the grateful scent of aromatics.'

[1] *Fraser's Magazine.* [2] Vol. ii. chap. xii. p. 104.

Pliny speaks of numerous cosmetics in use among the Romans. They dyed their hair black with St. John's Wort, the myrtle, the cypress, boiled leek-parings, and walnut-shells.

> Coma tum mutatur, ut annos
> Dissimulet, viridi cortice tincta nucis.[1]

A mixture of oil, ashes, and earthworms prevented the hair from turning white; myrtle-berries were an antidote to baldness; and the growth of hair was, even at that early period, promoted by the use of bear's-grease. To make the hair flaxen they used vinegar lees or quince juice mixed with that of privet. It would seem from a passage in Propertius that some affected persons dyed the hair blue.

> An si cæruleo quædam sua tempora fuco
> Tinxerit, idcirco cærula forma bona est?[2]

It was also the custom among the Roman women to darken their eyebrows.

> Neque illi
> Jam manet humida creta.[3]

Carmine was used for colouring the cheeks; mandrake for effacing scars on the face; and, in addition to these simple substances, the Roman perfumers had also compounded a variety of mixtures which are recorded by Pliny or mentioned in Ovid's 'Cosmetics,' and some of which have transmitted to posterity the names of their inventors. Martial has preserved the names of Niceros, Cosmus, Folia, &c.

In the Romish Church incense is used in many ceremonies, and particularly at the solemn funerals of the hierarchy, and other personages of exalted rank.

Pliny makes a note of the tree from which frankincense is procured; and certain passages in his works indicate that dried flowers were used in his time by way of perfume, and

[1] Tibullus, i. 8. [2] II. 17. [3] Hor. *Epod.*

that they were, as now, mixed with spices, a compound which the modern perfumer calls *pot-pourri*, used for scenting apartments, and generally placed in some ornamental vase.

It was not uncommon among the Egyptian ladies to carry about the person a little pouch of odoriferous gums, as is the case to the present day among the Chinese, and to wear beads made of scented wood. The 'bdellium' mentioned by Moses in Genesis is a perfuming gum, resembling frankincense, if not identical with it.

Several passages in Exodus and also in other parts of the Scriptures[1] prove the use of perfumes at a very early period among the Hebrews. In the thirtieth chapter of Exodus the Lord said unto Moses :—

1. And thou shalt make an altar to burn incense upon; of shittim wood shalt thou make it. . . . 7. And Aaron shall burn thereon sweet incense every morning; when he dresseth the lamps he shall burn incense upon it. . . . 34. Take unto thee sweet spices, stacte, and onycha, and galbanum; these sweet spices with pure frankincense: of each shall there be a like weight. . . . 35. And thou shalt make it a perfume, a confection after the art of the apothecary,[2] tempered[3] together, pure and holy. . . . 36. And thou shalt beat some of it very small, and put of it before the testimony in the tabernacle of the congregation, where I will meet with thee; it shall be unto you most holy. . . . 37. And as for the perfume which thou shalt make, ye shall not make to yourselves according to the composition thereof; it shall be unto thee holy for the Lord. . . . 38. Whosoever shall make like unto thee to smell thereto, shall even be cut off from his people.

It was for this religious custom, of employing incense in the ancient

[1] Gen. xxxvii.; Exodus xxx.; Ps. cxxxiii.; Exodus xl.; Numb. xvi.; 2 Chron. xxvi.; Is. xxxix.; 2 Chron. ix.; Cant. iv.; St. Mark xiv.; Ps. xlv.; Prov. vii.; Est. ii.; Cant. i.; St. John xix.; 2 Kings ix.

[2] In Drs. D'Oyly and Mant's Bible this word 'apothecary' is italicised, *perfumer*.

[3] 'Tempered.' The same writers render this word *salted*—that is, mixed with nitre—which is probably the correct interpretation, because such a mixture of resinous substances would not burn kindly without being previously 'tempered' with saltpetre.

temples, that the royal prophet drew that beautiful simile of his, when he petitioned that his prayers might ascend before the Lord like incense. It was while all the multitude was praying without, at the hour of incense, that there appeared to Zachary an angel of the Lord, standing on the right side of the altar of incense (Luke i. 10). That the nations attached a meaning, not only of personal reverence, but also of religious homage, to an offering of incense, is demonstrable from the instance of the Magi, who, having fallen down to adore the new-born Jesus, and recognised his Divinity, presented Him with gold, myrrh, and frankincense. It does not appear, however, that the Jews made much use of perfumes in their toilet, deterred either by the severe injunctions of the law of Moses against the personal use of preparations reserved for the holy place, or by their nomadic life, which did not allow of their practising an art fitted only for an advanced civilisation. They were accustomed to anoint themselves with perfumes before meals; but it is pretty certain that they made little progress in the art of perfumery, and contented themselves with aromatics in their natural state, or, at the most, dissolved in suitable vehicles. The primitive Christians imitated the example of the Jews, and adopted the use of incense at the celebration of the Liturgy. St. Ephraem, a father of the Syriac Church, directed in his will that no aromatic perfumes should be bestowed upon him at his funeral, but that the spices should rather be given to the sanctuary. The use of incense in all the Oriental churches is perpetual, and almost daily; nor do any of them ever celebrate their Liturgy without it, unless compelled by necessity. The Coptic, as well as other Eastern Christians, observe the same ceremonial as the Latin Church in incensing their altar, the sacred vessels, and ecclesiastical personages.[1]

The Rev. T. J. Buckton, describing *the precious ointment* of the Scriptures, says:—

The sacred oil, with which the tabernacle, the ark of the covenant, the golden candlestick, the table, the altar of incense, the altar of burnt-offerings, the laver, and all the sacred utensils, and indeed the priests themselves, were anointed, was composed of a hin of the oil of olives, of the richest *myrrh*, of *cassia*, of *cinnamon*, and of sweet *calamus*. The proportions of the mixture were 500 parts of the myrrh and cassia, and 250 each of the cinnamon and calamus. This ointment could not be applied to any other purpose (Exod. xxx. 20-33). The Septuagint names *one* of the ingredients, the myrrh, σμύρνης ἐκλεκτῆς, which corresponds with the myrrh, μύρον βαρυτίμου, of Matthew (xxvi. 7), described as πολυ-

[1] Dr. Rock's *Hierurgia*.

τελής by Mark (xiv. 3), and as πολύτιμος by John (xii. 3). The ointment probably prepared for Lazarus, which his sister Mary poured on the head and body of our Lord, consisted therefore of one only of the four ingredients of the sacred oil in use in the first Temple. Judas reprehended this anointing, as practised at banquets, as an extravagant luxury. So Martial (III. xii. 4) says:—

'Qui non cœnat et ungitur, Fabulle,
Hic vere mihi mortuus videtur.'

This view was corrected by our Lord, who says it was done preparatory to his entombment (Mark xiv. 8). Thus Jahn, in explaining the above passages in the Gospels, says:—'It was their custom to expend upon the dead aromatic substances, especially myrrh and aloes, which were brought from Arabia. This ceremony is expressed by the Greek verb ἐνταφιάζειν [to embalm or entomb], and was performed by the neighbours and relations.'

In the other case (Luke vii. 37) the myrrh was only applied to the feet of our Lord after washing, and previous to partaking of a meal,—a common practice of antiquity, and once performed by our Lord himself to his disciples; when, however, no mention is made of anointing, it being probably too costly for general use. At Sparta, the selling of perfumed ointments was wholly prohibited; and in Athens, *men* were not allowed to engage in it. Different ointments were used for different parts of the body.—ESCHENBURG, iii. s. 170.

Gibbon[1] says:—

In a magnificent temple, raised on Palatine Mount, the sacrifices of the god Elagabalus (the sun) were celebrated, with every circumstance of cost and solemnity. The rarest aromatics were profusely consumed on his altar.

Horace, in an ode celebrating the return of Augustus from Spain, bids his slaves go and seek for perfumes, and desires the tuneful Neæra to make haste and collect into a knot her scented hair. These passages sufficiently indicate the elegant direction which the taste of the Romans took in the days of this poet, who himself was a voluptuary in flowers and fragrances.

Perfumes were used in the Church service, not only under

[1] *Decline and Fall*, vol. i. chap. vi. p. 234.

the form of incense, but also mixed in the oil and wax for the lamps and lights commanded to be burned in the house of the Lord. The brilliancy and fragrance which were often shed around a martyr's sepulchre, at the celebration of his festival, by multitudes of lamps and tapers, fed with aromatics, of which camphor was an important ingredient, have been noticed by St. Paulinus :—

> With crowded lamps are these bright altars crowned,
> And waxen tapers, shedding perfume round
> From fragrant wicks, beam calm a scented ray,
> To gladden night, and joy e'en radiant day.[1]



SEVEN-BRANCHED CANDLESTICK.

The above illustration represents the seven-branched candlestick used in the Temple of Jerusalem. In it were burned fragrant tapers shedding perfume and light around during the holy service. The sketch is taken from the sculpture on the arch of Titus, showing the spoils of the Temple brought by the soldiers at the sacking of the Holy City.

Constantine the Great provided fragrant oils, to be burned

[1] Dr. Rock's *Hierurgia*.

at the altars of the greater churches in Rome; and St. Paulinus, of Nola, a writer of the end of the fourth and beginning of the fifth century, tells us how, in his times, wax tapers were made for church use, so as to shed fragrance as they burned:—

Lumina ceratis adolentur odora papyris.

Gold, frankincense, and myrrh, in silken bags, are still presented on Twelfth-day at the Chapel Royal in St. James's Palace. Formerly, the offering was made by the sovereign in person. The 'Daily Post' newspaper, on Thursday, January 7, 1742, informed its readers that

Yesterday, being Twelfth-day, his Majesty, the Duke, and Princesses went in state to the Chapel Royal, assisted at divine service, and during the offertory his Majesty advanced to the altar; and, according to the ancient custom of the kings of England, offer'd three purses fill'd with gold, frankincense, and myrrh, in commemoration of the presents made by the Eastern Magi as on that day at the Manifestation.

At present the offering is made by two persons connected with the Lord Chamberlain's office. These gentlemen approach the altar during the reading of the offertory sentences; and, taking the purses said to contain the gold, frankincense, and myrrh, place them on the alms dish, which is held forth for their reception by one of the officiating priests.

After Edward the Confessor restored, or rather rebuilt, Westminster Abbey, he was so desirous of rendering the Abbey almost unique in its attractions, that he endowed it with relics—in those days beyond all price. Among these things are to be noted here 'part of the frankincense offered to Jesus by the Eastern Magi.'[1]

In accordance with an ancient custom, the Pope of Rome

[1] MSS. of the Time of Henry III.; Luard's *Life of Edward the Confessor.*

every year blesses what is called the Golden Rose. This flower, which is made of the purest gold, and ornamented with precious stones, is rubbed with balm, ambergris, musk, and incense. His Holiness recites verses explaining the mystic meaning of the benediction, after which he takes it in his left hand, and then blesses the people. Mass is then celebrated in the Sistine Chapel. The gold roses are ordinarily sent to female sovereigns, sometimes to princes, and sometimes, though rarely, to towns and corporations; the one of 1862 was sent to the Empress of the French, and that of the year before to the Queen of Spain. Our Henry VIII. in the sixteenth year of his reign received the golden rose from Clement, as a token of friendship. The form of the golden rose has undergone considerable modifications. It is said originally to have consisted of a single rose; of late years it has consisted of several branches, with a rose on each, the plant being placed in a golden vase, as in the accompanying woodcut from an engraving in the works of F. A. Rocce.



THE GOLDEN ROSE.

So also before the fifteenth century it was not the usage to bless the rose, but only to anoint it with balsam and perfume it with musk; the latter, it is said, as well as the thorns on the stem and the red tinge on the petals, having been introduced in allusion to the passion of Our Lord.

A beautiful example of the golden rose is preserved in the

sacristy of St. Mark's, at Venice, to which it was presented by Pope Gregory in 1833, in memory of his having taken his monastic vows in that city. The pedestal is supported by four lions, and decorated with the papal arms and arabesque ornaments.

The rose, a symbol of silence, gave rise to the phrase *sub rosâ*, 'under the rose,' said to have arisen from the circumstance of the pope's presenting consecrated roses which are placed over the confessionals at Rome to denote secrecy.

A perfume in common use, even to this day, was the invention of one of the earliest of the Roman nobles, named Frangipani, and still bears his name: it is a powder, or sachet, composed of every known spice, in equal proportions, to which is added ground iris or orris root, in weight equal to the whole, with one per cent. of musk and civet. A liquid of the same name, invented by his grandson Mercutio Frangipani, is also in common use, prepared by digesting the Frangipani powder in rectified spirits, which dissolves out the fragrant principles. This has the merit of being the most lasting perfume made.

'Notes and Queries' recently published an article on 'The Origin of Frangipani,' which has sufficient interest for us to transfer the matter to these pages.

This is the name of a composition sold as a perfume, and which of late, through the enterprise of its vendors, has been pressed on the attention of the public through the advertising columns of our newspapers, periodicals, &c. The origin of the term seems worthy of a note, especially as many, I doubt not, have, like myself, supposed it to be without more signification than the names of other perfumes; but such is not the case.

There is in Rome a family bearing the patronymic of Frangipanni, as famous in Italy as the Plantagenets and the Tudors in England. The origin of the name of this family is traced to a certain office which an ancestor filled in the Church—that of supplying the holy bread, the wafer, in one of the ceremonials. Frangipanni literally means 'broken bread,' and is derived from *frangi*, to break, and *panus*, bread. Hence we

have the Frangipani puddings, which good housewives know are made with the broken bread. One member of this ancient family, Mutio Frangipani, served in France, in the papal army, during the reign of Charles IX. The grandson of this nobleman was the Marquis Frangipani, Maréchal des Armées of Louis XIII.; and he it was who invented a method of *perfuming gloves*, which, when so perfumed, bore the name of 'Frangipani gloves.'[1] Ménage, in his 'Origini della Lingua Italiana,' published at Geneva in 1685, thus notices the Marquis and his invention :—

'Da uno di que' Signori Frangipani (l'abbiam veduto qui in Parigi) furono chiamati certi guanti porfumati, *Guanti di Frangipani.*'

From the following passage in Le Laboureur's 'Mémoires de Castelnau,'[2] it appears that the brother of the Marquis Frangipani had a share in the invention :—

'Ce dernier Marquis Frangipani, et son frère mort auparavant luy, inventèrent la composition du parfum et des odeurs qui retiennent encore le nom de Frangipane.'

What the composition of the perfume was that gained for the Marquis so much reputation, I have not been able to discover. Ménage, who, it will be observed, was a contemporary, and had met the Marquis in Paris, alludes merely to *perfumed gloves*, and I am inclined to think that this was the only form in which the invention at first appeared. Le Laboureur speaks of his inventing 'la composition du parfum et des odeurs,' which, perhaps, may be understood to refer to some essence, powder, or pommade. This much, however, is certain, that various compositions, as *pommade*, *essence*, and *powder*, distinguished by the name of *Frangipani* or *Frangipane*, were sold by perfumers down to the latter part of the last century, when they gradually fell into disuse. M. Charles Piesse, a perfumer of Nice, was certainly at that period the most celebrated maker of Essence de Frangipane in Europe. During the last few years, however, the name has again found its way into the list of perfumes, and *Frangipani* is now sold more than it probably ever was before. The *formulæ* for the various compounds, as 'Pommade à la Frangipane,' 'Esprit de Frangipane,' &c., are so utterly discrepant, and have such slender pretensions to represent the original, that it is needless to quote them, and I shall only refer the reader who wishes for them to the works named below.[3]

[1] Vide Bayle, *Dictionnaire Historique et Critique;* Moreri, *Grand Dictionnaire*, éd. 1740, tome iv. p. 183.

[2] Ed. Bruxelles, 1731, tome ii. p. 651.

[3] Celnart, *Nouveau Manuel complet du Parfumeur*, Paris, 1854, 18mo; Piesse, *Art of Perfumery*, London, 1856, 8vo.

The subject of *perfumed gloves*, which, I may remark, have long since disappeared from use, introduces us to some curious particulars regarding the trades of glover and perfumer. Savary, in his 'Dictionnaire Universel de Commerce' (Genève et Paris, 1750), tells us that the glovers of Paris constitute a considerable community, having statutes and laws dating so far back as 1190. These statutes, after receiving various confirmations from the kings of France, were renewed, confirmed, and added to by Louis XIV., under Letters Patent, in March 1656. The glovers are therein styled 'Marchands Maîtres Gantiers-Parfumeurs.' In their capacity of glovers, they had the right of making and selling gloves and mittens of all sorts of materials, as well as the skins used in making gloves; while as perfumers they enjoyed the privilege of perfuming gloves, and of selling all manner of perfumes. Perfumed skins were imported from Spain and Italy, and were used for making gloves, purses, pouches, &c.; they were very expensive and 'fort à la mode,' but their powerful odour led to their disuse as gloves; nevertheless, 'Peau d'Espagne' is in considerable demand for perfuming letter paper. There were issued to the public, from the Laboratory of Flowers, in New Bond Street, last year, 1,808 pieces of four inches square. With regard to gloves, Savary remarks :—

'Il s'en tiroit autrefois quantité de parfumés d'Espagne et de Rome; mais leur forte odeur de musc, d'ambre, et de civette, qu'on ne pouvoit soutenir sans incommodité, a fait que la mode et l'usage s'en sont presque perdus; les plus estimés de ces Gans étoient les Gans de Franchipane et ceux de Neroli.'[1]

Many receipts are extant for the perfuming of gloves, and, though some of them are curious, they are too lengthy for me to quote more than the titles. Here, in the 'Secreti de la Signora Isabella Cortese ne' quali si contengono Cose Minerali, Medicinali, Artificiose ed Alchimiche, e molte de l'Arte Profumatoria, appartenenti a ogni gran Signoria' (Venet. 1574, 12mo), we find directions for 'Concia di guanti perfettissima, con musco ed ambracan,' and again 'Concia di granti senza musco perfetta.' I have also before me, from an old French work published at Lyons in 1657,[2] the precise directions for 'Civette très exquise pour parfumer gands et en oindre les mains.' In these compositions musk, ambergris, and civet were the chief perfumes; and as they were applied inside the gloves, combined with some sort of oil or grease, their use at the present day would be thought intolerable. The gloves of Frangipani were also prepared with grease, as I think we may gather from the following lines of Cerisantes :[3]—

[1] Tome ii. p. 619. [2] *Les Secrets du Seigneur Alexis Piemontois.*

[3] They form part of an ode addressed 'Ad Vincentem Victurum,' which

'Amice, nil me sicut anteà juvat
Pulvere vel Cyprio
Comam nitentem pectere;
Vel quas Britannus texuit subtiliter
Mille modis varias
Jactare ventis tænias;
Vel quam *perunxit* Frangipanes ipsemet
Pelle, manum gracilem,
Coràm puellis promere.'

The word *Franchipanne*, or *Frangipane*, is applied in French cookery to a sort of pastry composed of almonds, cream, sugar, &c. In the West Indies it is used to designate the fruits of *Plumiera alba* L., and *P. rubra* L., because, according to Merat and De Lens,[1] 'on retrouve dans ces fruits mûrs le goût de nos franchipanes.' If these fruits are eatable, it is remarkable that neither Sloane nor Lunan mentions the fact. *Frangipanier* is, however, the French name of the *Plumiera*.—D. H.

One Mercutio Frangipani, who lived in 1493, was a famous botanist and traveller, famous as being one of the Columbus expedition when they visited the West India Islands. The sailors, as they approached Antigua, discovered a delicious fragrance in the air. This, Mercutio told them, must be derived from sweet-smelling flowers. On landing they found vast quantities of the Plumiera Alba, in full bloom, rendering the air redolent with rich odour; and from this plant, which the present inhabitants of Antigua call the Frangipani flower, is distilled that exquisite fragrance which is now so popular in fashionable circles.

The trade for the East in perfume-drugs caused many a vessel to spread its sails to the Red Sea, and many a camel to plod over that tract which gave to Greece and Syria their importance as markets, and vitality to the rocky city of Petra. Southern Italy was not long ere it occupied itself in ministering to the luxury of the wealthy, by manufacturing scented unguents and perfumes. So numerous were the UNGUENTARII, or perfumers, that they are said to have filled the great street of ancient Capua.—HOFMANN.

It was a *dictum* of the celebrated Beau Brummell that no man of fashion should use perfumes, but send his linen to be washed and dried on Hampstead Heath. Few subscribed to

may be found at the end of the Latin letters of Balzac (*Balzacii Carminum Libri tres: ejusdem Epistolæ Selectæ*, ed. Æg. Menagio, Paris, 1650, 4to).

[1] *Dict. de la Matière Médicale*, tome v. p. 405.

this arbitrary mandate; and it certainly opposed all precedent both in ancient and modern times. The use of aromatics in the East may be dated from the remotest antiquity; and, even at the present day, to sprinkle guests with rose-water and perfume them with aloes wood at the close of every visit, is deemed a token of hospitality and friendship. In that excellent book which portrays the domestic life of the early Orientals, 'The Arabian Nights,' there will be found several passages indicating the use of perfumes; thus in the story of 'The Barber's Second Brother,' who, finding himself enticed into the palace of the grand vizier's lady to be made a sport and fool of for her amusement, had *his eyebrows painted like a woman*, his beard shaved off, *and was then perfumed with wood of aloes and rose-water.* Arabia is the country of perfumes; and in more ancient times it was the practice to keep them in shells, which were thrown up large and beautiful on the shores of the Red Sea. Horace alludes to the same practice as prevalent at Rome when he flourished:—

Funde capacibus
Unguenta de conchis.

Again he sings:—

Fill up the polished bowls with oblivious music; pour out the perfumed ointment from the capacious shells.

Perfumes were also thought to keep well in vessels made of alabaster. Pliny explains the shape of these vessels by comparing them to the pearls called elenchi, which are known to have been shaped like pears. In hot climates fragrant oils dispersed unpleasant odours which heat is apt to generate, and thus became essential to the enjoyment of social life. The poets of Greece and Rome were loud in the praise of perfumes. Thus Anacreon (Ode XV.) exclaims:—

Let my hair with unguents flow,
With rosy garlands crown my brow.

The magic power of Medea consisted in her skill as a perfumer, and as an inventress of warm vapour-baths. Mr. Beloe says of her that she first of all discovered a flower which could make the colour of the hair black or white: such, therefore, as wished to have black hair instead of white, by her means obtained their wish. That the professors of the medical art might not discover her secrets, she used fomentations in her baths in secret. These made men more active, and improved their health; and as her apparatus consisted of a caldron, wood and fire, it was believed that her patients were in reality boiled. Pelias, an old and infirm man, using this operation, died in the process.

But these practices were not confined to Oriental nations; for Herodotus (Melpomene, c. lxxv.) says:—'The Scythian women bruise under a stone some wood of the cypress, cedar, and frankincense; upon this they pour a quantity of water till it becomes of a certain consistency, with which they anoint the body and the face. This at the time imparts an agreeable odour, and when removed on the following day gives the skin a soft and beautiful appearance.' In the athletic exercises of the Olympic games, wrestlers and pancratists always anointed their limbs to make them more supple. In Greece the perfumes of Athens were most esteemed, as we learn from a curious passage preserved in Athenæus, from a fragment of the writings of Antiphānes, and the whole may amuse my readers. It runs thus, showing from what countries different degrees of excellence were obtained in his time:—'A cook from Ellis; a cauldron from Argos; wine of Phlius; tapestry of Corinth; fish from Sicyon; cheese from Sicily; the perfumes of Athens; and the eels of Bœotia.'

Sir John Bowring says that some porcelain jars were found in the adjacent ruins to the Pyramids, which contained cosmetics and perfumes three to four thousand years old; these jars bore Chinese inscriptions, the same which he has

since traced among the Chinese poets of about the earlier period.

In the 'Lives of the Queens of England' we read:—'Perfumes were never richer, more elaborate, more costly, or more delicate than in the reign of Elizabeth.' Her Majesty's nasal organs were particularly fine; and nothing offended her more than an unpleasant smell. Perfumes and cosmetics of all kinds were in general use. The cosmetics and other smaller accessories to a lady's toilet were kept in boxes strongly impregnated with some favourite odour, and were



ANCIENT SWEET COFFER.



MODERN VINAIGRETTE.

called 'sweet coffers.' This term perpetually occurs in the old writers; they were reckoned a necessary part of the furniture of all state bed-chambers, and a fair criterion, by their form and richness, of the taste and liberality of the owner. The bottles of perfume connected with the common labours of the toilet were called 'casting bottles.' The pomander, which originally was meant only as a preventive of infection, as a camphor-bag is now, but became an article of fashionable luxury amongst people of rank, was a little ball

of perfumed paste worn in the pocket, or hung round the neck. They soon became mediums for the most exquisite devices in jewellery, and were frequently offered as complimentary tokens, like the snuff-boxes of the present day. Many pomanders were presented to Queen Elizabeth as new-year's gifts, and among the list is the somewhat puzzling item of—

A farye girdle of pomander.

Perfumed gloves were also fashionable.

Elizabeth had a cloak of Spanish perfumed leather, the value of which may be estimated by stating that pieces of 'Peau d'Espagne' are now sold by the Bond Street perfumers of London at the rate of one shilling the square inch; even her shoes were perfumed. The city of course soon imitated the fashion of the court, as is apparent from frequent allusion by the dramatic writers of the time.

The extensive and free use made of essences and scents at this period gave rise to numerous satirical observations by the authors of the day. The following verse appears in Anstey's 'New Bath Guide,'—Bath then becoming the focus of everything refined and fashionable,—

Bring, oh bring the essence pot!
Amber, musk, and bergamot,
Eau de Chipre, eau de Luce,
Sanspareil and citron juice.

As an indication of the 'spirit of the times' of the latter part of the seventeenth century, we may here mention that an Act was introduced into the English Parliament, in 1770:—

That all women, of whatever age, rank, profession, or degree, whether virgins, maids, or widows, that shall, from and after such Act, *impose upon, seduce*, and betray into matrimony, any of his Majesty's subjects, by the scents, paints, *cosmetic washes, artificial teeth, false hair*, Spanish wool (wool impregnated with carmine, and used to this day as a rouge), iron stays, hoops, high-heeled shoes, bolstered hips, shall incur the

penalty of the law now in force against witchcraft and like misdemeanours, and that the marriage, upon conviction, shall stand null and void.

In Nichols's 'Progress of Queen Elizabeth,' he mentions that at Hawkstead, among the rooms on the ground floor, was one called the 'still-room,' an apartment where ladies of the court much amused themselves in distilling fragrant waters.

In the 'Northumberland Household Book,' a work so often quoted by historians, there appears the following list of plants:—Roses, Borage, Fumitory, Brakes, Columbynes, Oak-leaf, Harts-tongue, Draggon, Parcelly, Balme, Walnut-leaves, Ox-tongue, Primrose, Sage, Sorrel, Betony, Cowslip, Elder-flowers, Marygold, Tansy, and others, all for the use of the still-room.

All great men's houses possessed such an apartment, and ladies took lessons in the art of preparing perfumes and washes.

Shakspeare makes Cleopatra study (though it would seem for dangerous purposes) the properties of plants, and Cymbeline order the gathering of innocent flowers, to cover as guilty an object.

Advocating the proper use of the olfactory faculty as we do, it gives pleasure to quote a passage bearing upon the subject from Sir W. Temple's 'Essay on Health and Long Life.'

Fumigation, or the use of scents, is not, that I know of, at all practised in our modern physic, nor the power and virtues of them considered among us, yet they may have as much to do good, for aught I know, as to do harm, and contribute to health, as well as disease, which is too much felt by experience in all that are infectious, and by the operations of some poisons that are received by the smell. How reviving as well as pleasing some scents of herbs and flowers are, is obvious to all; how great virtues they may have in diseases, especially of the head, is known to few, but may easily be conjectured by any thinking man.

I remember, he continues, that walking in a long gallery of the Indian House of Amsterdam, where vast quantities of mace, cloves, and nutmegs were kept in great open chests all along one side of the room, I found

something so reviving by the perfumed air, that I took notice of it to the company with me, which was a great deal, and they all were sensible of the same effect, which is enough to show the power of smells and their operations both upon the health and humour.

Thanks to Stow, we are acquainted with the exact period at which perfumes were introduced into England.

Milloners or haberdashers, he says, had not then any gloves imbroydered or trimmed with gold or silke ; neither could they make any costly wash or perfume, until about the fifteenth yeere of the queen (Elizabeth), the Right Honourable Edward de Vere, Earl of Oxford, came from Italy, and brought with him gloves, sweete bagges, a perfumed leather jerkin, and other pleasant things ; and that yeere the queene had a pair of perfumed gloves, trimmed only with four tuffes, or roses of coloured silk : the queene took such pleasure in those gloves, that she was pictured with those gloves upon her handes, and for many yeeres after it was called the Earl of Oxford's perfume.

The old comedies of Elizabeth's time are full of allusions to oils and essences, quintessences, pomatums, perfumes, and paint, white and red. Strutt quotes a MS. receipt of this date to make the face of a beautiful colour. A person desirous of improving his complexion was to be placed in a bath, that he might perspire freely, and afterwards to wash his face with wine, and 'so should he be both faire and ruddy.' The Earl of Shrewsbury, who had charge of the unfortunate Queen of Scots, made an application for an increased allowance, on the ground of her expensive habit of bathing in wine. Generally, elder beauties bathed in wine ; the young ones were contented with milk. Milk baths were in the height of fashion in Charles the Second's reign. But the attempt thus to cheat Time of his wrinkles was vain ; the would-be fair ones were driven in despair to conceal what they found it impossible to remove, and patches became the rage.

Philip Augustus of France granted a charter to the master-perfumers in 1190. Perfumes first became fashionable in England in the reign of Elizabeth. In 1800 there were

about forty manufacturing perfumers in London, in Paris eighty. No such trade as a perfumer was known in Scotland in 1763. A stamp-tax was laid on various articles of perfumery in England, and the vendor was obliged to take out a licence in 1786.—Haydn's 'Dictionary of Dates,' 1868.

The first work on the subject, strictly on the manufacture of perfumery, was written by Charles Lillie, under the title of the 'British Perfumer,' 1822. The author was noticed in the 'Spectator,' 'Tatler,' and 'Guardian,' periodicals of the day. After Lillie's death the house he occupied at the corner of Beaufort Buildings, in the Strand, was held by Ackerman, the celebrated print-seller, and by a curious coincidence is now the repertory of my friend Rimmel.

The ancients indulged in perfumes much more luxuriously than we do. Mr. Sidney Whiting, in his imaginative and scholarly production, 'Heliondé; or, Adventures in the Sun,' fancifully describes the inhabitants of that orb as sustaining life solely upon sweet scents.

Curious as are the records of the indulgence of former ages in cosmetics and aromatics, it has certainly been reserved for our own time to perfect the science of perfumery. Within the laboratory of the perfumer, chemistry now holds a recognised place, and acres of some of the fairest spots in Europe and Asia are devoted to the cultivation of flowers whose fragrance is no longer wasted on the desert air, but preserved for the enjoyment of all throughout the year, and at a time and place when and where their beauty and fragrance is bereft.

To the above sketch of the history of perfumery in England must be added a similar sketch of its history in France. In early times, as we have already stated, Rome received large quantities of perfumes from the Gauls, and most of the Roman artists (or *perfumers?*) belonged to the Gallic nation.

These traditions were perpetuated. Clotilda heightened her

charms with balsams and ointments; the fairy Melusina and the enchanter Merlin had all kinds of wonderful preparations for preserving their beauty; the magician and the alchemist devised precious philtres for keeping lovers faithful, and infallible recipes for procuring to themselves eternal youth.

Gregory of Tours speaks of the art by which Clotilda, Brunehilda, and Galasuinta heightened the splendour of their attractions. He informs us that the Franks and the Gauls were acquainted with several artificial wines, which he calls *vina odoramentis immixta.* Forest, author of the romance of 'Perseus,' also observes, in describing a feast, that every guest, male and female, had a wreath of roses on the head. Mathieu de Coucy relates that at a banquet given by Philip the Good, Duke of Burgundy, there was a figure of a child from which gushed rose-water.[1]

In the first age of the French monarchy, it was customary to place in open coffins scent-boxes and perfumes, which gave out their fragrance under the influence of heat. Such scent-boxes have been found in the tombs of one of the churches of Paris.

Perfumes figured among the presents which Harun-al-Raschid sent to Charlemagne; and the Arabs, when they invaded Spain, introduced there unguents and cosmetics till then unknown. The Crusades endowed Europe with new perfumes; and by the discovery of America cacao, vanilla, balsam of Peru, balsam of Tolu, &c., became known to us.

During the Renaissance the most celebrated perfumers in France were the Italian artists, invited by Francis I. and Catherine de' Medici. This period may be compared with the age of Martial in respect to the excessive use of pastes and pomades, perfumed gloves, and all the refinements of art. It is recorded by historians that Diana of Poitiers, by the use of cosmetics, preserved her beauty to an age at which her rivals

[1] 'Une statue d'enfant qui pissait de l'eau de roses.'

had ceased to charm. It is even alleged that she possessed the secrets of Paracelsus. By the side of the Lady of Anet shone Margaret, Pearl of pearls, and the heroines celebrated by Brantôme, who availed themselves of all the resources of the art of cosmetics. At this period appeared the works of Saigini, Guet, Dettazy, Isabella Cortese, and Marinello[1] on cosmetics, all treating the subject in a remarkable way.

Under the sovereigns of the house of Valois the use of perfumes was carried to excess; and the pastes, pomades, and musk of Poppæa, recovered for Henry III. and his favourites, led to a kind of reaction in the following reign against perfumes and cosmetics. But the habits of René the Florentine, the gloves of the Queen of Navarre and those of the fair Gabrielle contributed to this revulsion of feeling; just as the powder sellers at a later day alarmed the court of Louis XIV.

After being neglected under Henry IV., who spent his days in camps and cared little for odours and ointments, perfumes again came into favour at the court of Louis XIII., under the influence of the beautiful Anne of Austria.

Almond paste and the creams of cacao and vanilla, imported from Spain, were used to whiten the hands and the shoulders of the fair ladies of the court and of the Hôtel de Rambouillet. It was at this time that the most affected and far-fetched names, mostly borrowed from the vocabulary of De Tendre, began to be applied to cosmetics. These were again proscribed by Louis XIV., who detested them; and once more they revived, and finally, under the Regency. The beauty of Ninon de Lenclos, which was so long preserved, shows what advance the art of the perfumer had then made.

With the Regency perfumes reappeared at court. At this time the Maréchale powder was invented, and the important

[1] *Gli ornamenti delle donne.* Venezia, 1574.

works of Jean Liebault on perfumery were published.[1] Powders, paint, and pomades were used. Ninon de Lenclos kept her beauty to her sixtieth year; and Cagliostro at a later day sold to the Dubarry a wonderful recipe, which secured to her youth and beauty to the borders of old age. Marshal Richelieu in his last years used to have sweet odours diffused in his rooms by means of bellows. M. Claye assures us that one of the cosmetics most efficient in maintaining the beauty of Madame de Pompadour is now in the possession of the firm of Violet. The receipt was transmitted to this firm by the heirs of Manon Foissy, chambermaid to the marchioness.

Under Queen Marie Antoinette the taste for perfumes was refined. Instead of sharp strong odours, the scent of the violet and the rose was relished. This preference has lasted to our days.

As we have mentioned perfumed gloves, which, by the way, have long fallen into disuse, we will communicate some curious details respecting the trade in gloves and perfumes.

Before the Revolution, says Louis Claye, perfumery was placed under the control of the corporations. In 1190 Philip Augustus granted to the perfumers some statutes, which were confirmed by King John, December 20, 1357, and by royal letter of Henry III., July 27, 1582; and by these laws the trade was regulated down to 1636. Under Colbert, who gave a powerful stimulus to French commerce, the perfumers (or *parfumeurs-gantiers*, as they were then called,) obtained patents registered in the Parliament, which prove the important position they had acquired. Their fraternity was established at St. Anne's Chapel, in the Church of the Innocents. By patents granted July 20, 1426 by Henry VI., king of England, who during the troubles of the reign of Charles VII.

[1] *Quatre livres de Secrets de médecine et de la philosophie chimique.* Rouen, 1628.

styled himself king of France, the arms of the perfumers, as registered in the Armorial General of France, are—Argent, three gloves gules, chief azure, charged with antique scent-box gold.[1]

The influence of the Revolution made itself felt in the business of perfumery. There were guillotine dresses, Sanson pomades, &c. Various preparations, which have become historical, have come down to the present day from the Directory and the Empire. It was at this period that a transformation took place in the trade of the perfumer by the adoption of a scientific basis for his art. It was under the Directory also that five ladies revived the perfumed baths of the Greeks and Romans. Madame Tallien, on leaving a bath of strawberries and raspberries, had herself gently rubbed with sponges soaked in milk and perfumes.

The Emperor Napoleon I. was very susceptible to the action of perfumes. He used every morning to apply eau de Cologne to his head and shoulders. The Empress Josephine had the taste of a Creole for flowers and perfumes. She had brought from Martinique cosmetics which she always continued to use. The consumption of perfumes was at this epoch at its greatest height.

The taste for perfumes and cosmetics is at the present day carried to a very high pitch. Immense factories have been established and storehouses built; and London and Paris supply perfumes to all parts of the world. Its annual products exceed in value 50,000,000 francs (2,000,000*l.* sterling).

M. Claye justly points out that we must distinguish three classes of perfumery—the fine; the ordinary, made by honest manufacturers of reputation; and the anonymous, consisting of articles ill-made, spurious, and pirated. In Paris there are numerous perfumery houses for the production of the purest articles only, and their business is conducted with the large

[1] Claye, *Les Talismans de la beauté*, p. 22.

knowledge, unwearied attention, conscientiousness, and sense of honour indispensable in such case. For these productions, according as they are more or less skilfully prepared, may confirm health, preserve beauty, or gradually ruin the constitution. We may, without fear of contradiction, enumerate the firms of Chardin and Massignon, Chardin of the rue du Bac, Demarson, Gellé, Lubin, Pinaud, Piver, and Violet among the best representatives of the perfumery business in Paris, Atkinson, Hendie, Low and Son, Cleaver, Pears, and Piesse and Lubin of London, with respect to fine quality, purity, and hygienic efficacy of their wares.

The manufacturer can guarantee only what he himself makes. He selects the raw materials, and under his eyes all perfumes and all cosmetics are prepared. It is the only safeguard against deception as to the nature of the substances employed. The first condition to be fulfilled in the case of ordinary perfumery is to produce quickly and cheaply. It is difficult to wait for such modifications as are effected in certain articles only by great care and long patience. Many substances are purchased ready made, and have only to be perfumed and adapted. Adulteration and the pirating of the name or the form frequently begin in the ordinary perfumeries; but these practices are almost certain to be allowed in the common and anonymous houses. The only means of safeguarding the interests of the perfumer, and of protecting the public health against such scandalous and perfidious tricks, is the adoption of trade-marks by the manufacturer, and the appointment of trustworthy agents whose respectability will guarantee to the consumer the genuineness of the goods delivered.

The perfuming-pan, which was kindled in the palaces of Babylonia, Susa, and Venice, still smokes in the seraglios of Teheran and on the shores of the Bosphorus. The life of sultana and odalisque is spent on cushions scented with amber,

the mouthpiece of the narghilé on their lip, between the hour of the bath and the arrival of the master. In the mysteries of the toilet, the Mussulman women still follow the religious injunctions and formulæ of the commentators on the Koran. The monopoly of depilatory pastes and cosmetics, used after the bath which every Friday purifies the faithful, is held by the dervishes; but the East has now lost the monopoly of other perfumes and cosmetics. The orange-trees of Grasse, the irises of Florence, the lilies of Limagne, fill the place of Eastern flowers; and although Arabia still supplies us with the myrtle and its resins, India with santalwood and benzoin, and Tonquin with its musk, these perfumes reach our hands as raw material. Paris transforms them, gives them the stamp of fashion, and distributes them over the world. All the European capitals are supplied from French perfumeries. England, indeed, is a successful rival, as she gathers a harvest of good alcohols. Her vessels, like those of France, trade in America, in the East, in India, and in China. The great houses enjoy a reputation in America, in Russia, Turkey, Germany, Persia, China, and Japan. The Australian colonists are most lavish in the use of perfumes—all of English manufacture.

SECTION II.

Unbidden earth shall wreathing flowers bring,
And fragrant herbs the promises of spring,
As her first offering to the ruling king.—DRYDEN'S *Virgil.*

AS an art in England, perfumery had attained little or no distinction until thirty-five years past. This arose from those who followed it as a trade maintaining a mysterious secrecy about their processes. No manufacture that is carried on under a veil of mystery can ever become great or important to the community. I am rather of the Grecians' mind, who once a-year wrote in the temple of Æsculapius all the cures they had performed, and by what means they had effected them!

On the subject of trade mystery I will only observe, that I am convinced that it would be far more to the interest of manufacturers if they were more willing to profit by the experience of others, and less fearful and jealous of the supposed secrets of their craft. It is a great mistake to think that a successful manufacturer is one who has carefully preserved the secrets of his trade, or that peculiar modes of effecting simple things, processes unknown in other factories, and mysteries beyond the comprehension of the vulgar, are in any way essential to skill as a manufacturer, or to success as a trader.[1]

In the dark ages it was always a secret, a mystery, or a craft, in the hands of a guild, a profession, or a fraternity of some sort or other. In those days wisdom preyed upon ignorance, and nobody cared to know anything except as a means of overreaching his neighbour. Science, being thus divorced from reason, and robbed of its innocence, so to

[1] Professor Solly.

speak, was very naturally treated as a species of witchcraft, and a man who stole a march on the average intellect of the day was not unfrequently burnt for a dealer in the black art. It is well known that many who so suffered had to thank themselves for the delusion which proved fatal to them, as they had purposely mystified their knowledge of nature. There are secrets in these days, many of which are as highly prized and as jealously guarded as the secrets of mediæval art. Yet an atmosphere of secrecy is not generally conducive to public improvement, or even to private advantage. The first manufacturers of the age have no secrets. They are ready to show their works to any respectable stranger; and, even if they have gained upon their neighbours in some device for the economy of labour or material, they won't keep it to themselves. They trust to an improving spirit, and to an energy always in advance, rather than to the exclusive possession of this or that little 'dodge.' Small people don't understand this. They are always looking out for the trick which is to open the door of fortune, and show the royal road to inexhaustible wealth.[1]

If the horticulturists of England were instructed how to collect the odours of flowers, a new branch of manufacture would spring up in some of our warm colonies, to vie with our neighbours' skill in it across the Channel.

Time was, when in the *still-room* 'distilled waters' and 'cordials' were drawn and dispensed as specifics for maladies to guests and dependents; but now this practice is out of use, because they can be purchased cheaper than they can be made at home; nevertheless the *still-room maid* preserves her name, though rarely required to perform her ancient duties.[2]

[1] *The Times*, October 31, 1855.

[2] To expect the revival of this part of domestic economy would be absurd, yet we must say that a domestic laboratory attached to the conservatory would prove highly instructive and amusing. To those even who have no conservatory, we would yet advise to set a room apart in their mansions, with the title of 'laboratory,' or the ancient one of 'still-room.' Here experiments may be made, scents distilled, and an acquaintance courted with 'common things,' without interfering with other people of the establishment, or 'making a mess about the house.' The amount of instruction that can be derived from a private laboratory is far more than at first sight can be conceived; and the entertainment, changeable as a kaleidoscope, is intellectually considered immeasurably superior either to crochet

Of our five senses, that of SMELLING has been treated with comparative indifference. However, as knowledge progresses, the various faculties with which the Creator has thought proper in His wisdom to endow man will become developed, and the faculty of Smelling will meet with his share of tuition as well as Sight, Hearing, Touch, and Taste.

St. Paul tells the Corinthians, 'that there should be no schism in the body, but that the members should have the same care one for another. And whether one member suffer, all the members suffer with it; or one member be honoured, all the members rejoice in it; nay, much more those members which *seem* to be more *feeble are necessary.* If the whole body were an eye, where were the hearing? if the whole were hearing, where were the smelling?' These arguments appear so conclusive in favour of a just and proper estimation of the value of smelling, that it would seem impossible to neglect it without bodily suffering as a consequence.

Practically, the author has always found it so: among the lower orders, bad smells are little heeded; in fact, 'noses have they, but they smell not;' and the result is, a continuance to live in an atmosphere laden with poisonous odours, whereas any one with the least power of smelling retained shuns such odours, as they would any other thing that is vile or pernicious. In the public schools 'common things' are now being taught; to complete the idea, youth must be instructed that, when the nose is offended, the body will indirectly suffer. If they are not taught to know by name every odour that they smell, they can at least be made familiar with the deadly effects of sulphuretted hydrogen,

or Berlin work. The delicate manipulations of chemical experiments are well, even better, suited to their physical powers than to the sterner sex; and to the ladies, therefore, we commend the charge of becoming the *chefs* of the modern still-room.

and other of the putrescent gases, and so avoid them in future life.

The influence of this sense over the frame is very remarkable: one odour will instantly produce loathing, nausea, and vomiting; another has a part in producing an exhilarating effect upon the mind, such as the fragrance of the country air on a spring morning, or the sweet sea-breeze laden with the brominic odours from stranded weeds. The first smell of the sea to a landsman wonderfully affects the nervous system.

The fragrance of the fields in hay-making time, a walk in a garden at evening's close, both produce an exhilarating effect upon the mind.

Odours are capable of a very wide diffusion; so much so, that one can scarcely credit that at all times odour necessarily implies materiality. It seems that, in numerous instances, odour acts as an imponderable agent, rather than physical matter. It is clear that certain matters produce certain odours, but it is not equally definite that the matters in question are themselves the odours. My view of the case induces me to conclude that we can best understand the true theory of odours by viewing them as imponderable agents, affecting the nervous system by special vibrations, as colours affect the eye, and sounds the ear.

We may presume that such vibrations are caused by the chemical action set up by the contact of essences and perfumes with the oxygen of the air. We are able, indeed, to reduce them to an odourless state by excluding oxygen and volatilising them. The essences thus deprived of odour recover it instantaneously on contact with the air. In all chemical combinations vibrations occur which give rise to luminous or electrical phænomena. In certain cases other vibrations are produced which affect the olfactory nerve-

system. For such odour there would be a different velocity of vibration.

The analogy which exists between colour and sound has long been admitted. The ancients felt their connection when they identified the musical gamut as the *chromatic* scale. Bacon, and numerous writers since his time, has written upon this subject, and some have attempted to show that the harmony of colours agrees with the melody of the scale.

G. B. Allen, Mus. Bac., has written several papers in the 'Musical World,' On the Analogy existing between Musical Scales and Colours; wherein he shows that all composers of merit have perception of this analogy, and which is apparent in all their works.

Field, in his 'Chromatics,' arranges the scale thus:—

Blue	*Purple*	*Red*	*Orange*	*Yellow*	*Green*	*Olive*
Do	Re	Mi	Fa	Sol	La	Si

and proves the analogy by the following:—As the three primary colours, blue, red, yellow, in combination, or contrast, produce the most perfect harmony, so do the sounds, Do, Mi, Sol. The metrochrome and the monochord also prove their exact agreement. By this first instrument we discover that in pure white light there are eight degrees of blue, five of red, and three of yellow. And by the latter that eight parts of a string will give Do, five Mi, and three Sol. This agreement is curious, and proves the existence of some universal law of harmony.

For measuring the intensities of light and of sound we have a method founded on their respective velocities. Struck, like many other observers, with the strict analogy subsisting between the forces which affect our several senses, and particularly between those which affect the organs of smelling and of hearing, but failing to find any accepted criterion for measuring the intensity of an odour as that of a sound is

measured, I undertook a series of experiments for the purpose of discovering one.

For some time I had observed that when alcoholic solutions of various essences mixed together were allowed to evaporate in the open air, they underwent a sort of natural analysis; that is to say, the most volatile were the first to evaporate, the less volatile disappearing later. From the constant reproduction of the same phænomenon, when the essences were the same, I could not fail to see that a species of force, definite and inherent, passed away from each of these odorous bodies or remained in them for a longer or shorter time. This force I name the velocity of the odour, or, in other words, the force of volatility. Now I find a relation between this force of volatility and the manner in which an odorous substance affects the sense of smell. I do not pretend to say that a body possessing a large force of volatility will affect the organs of smell in a different way from another body with a lower force of volatility. I know that there are volatile bodies, *ex. gr.*, mercury and water, which have no smell; a phænomenon owing chiefly to the circumstance that their vapours are not soluble in the secretions which lubricate the nasal membranes. But I do maintain that substances which are exhaled naturally, or are extracted from plants or animals, and are recognised as odorous bodies, affect the olfactory nerves in direct proportion to their force of volatility, or the velocity of the odour, because it acts upon the odour of any body so far as this body is soluble in the pituitary secretion.

The force of volatility, or the velocity of the odour, cannot, consistently with the context, be defined and explained as it is in the above paragraph; and, particularly, we cannot say that the odours produced are in a direct ratio with the solubility of the vapours in the liquid arising from the pituitary secretion. For the vapour of water is certainly soluble

in this secretion, and is inodorous. It would be more correct to say that the force of volatility of essences, or the rapidity with which they evaporate, would always be in proportion to the velocity of the vibrations produced, or the rapidity with which the odorous waves might be propagated. If this velocity were not high enough, there would be no perceptible odour; just as with sounds, which remain inaudible unless they correspond to at least sixty vibrations per second. The liquid which lubricates the olfactory membrane, necessary for the perception of odours, would have as its function to increase the sensitiveness of the nerves, and thus render them more susceptible of odours.

Thus bodies possessing a very low degree of volatility are those known as strong odours; those, on the contrary, which have a high degree of volatility, are feeble and delicate odours. In this respect we note an analogy between odours and sounds. The loudest sounds are produced by sonorous waves which are the most slowly propagated; and the most powerful odours are produced by the most slowly propagated odorous waves.

In speaking even compendiously of the physiological action of odours, it is needful to remind the reader of the distinction existing between substances which irritate the nerves of the sense of touch and those which convey the impression of odours to the olfactory nerves. For certain solid substances, when pulverised, such as glass dust, soap powder, snuff, and some of the gases, *ex. gr.*, chlorine, ammonia, &c., stimulate the pituitary membrane. The effects produced by these substances are those of a body *touched*, not of a body *smelt*.

In other words, we must not confound the local mechanical action more or less irritating of certain bodies on the pituitary membrane with that of odours properly so called on the nerves of smell.

After a long series of experiments, the details of which would be out of place here, I have succeeded in drawing up a table of the degrees of volatility of odours, which indicates pretty nearly their relative strength. It will be of service to perfumers, guiding them, when mixing perfumes, in their selection in each case of such as are of different or equal degrees of volatility.

Volatility and Strength of Odours.

Water	1.0000
Essence of elder	0.2850
Citron	0.2480
Portugal	0.2270
English lavender	0.0620
French lavender	0.0610
Bergamot	0.0550
Parsley	0.0370
Petit grain neroli	0.0330
English thyme	0.0220
Lemongrass	0.0170
Spanish geranium	0.0106
French geranium	0.0074
Calamus	0.0069
English lemon thyme	0.0062
Essence of Turkey roses	0.0051
English bay	0.0039
Essence of French roses	0.0038
Clove	0.0035
Cedar	0.0020
Patchouly	0.0010

With respect to the chemical constitution of essences, I have recently established an important fact; namely, that in many cases the essence obtained from flowers by distillation is not identical with the perfume exhaled by the living flower.

The vapour of water acts chemically on an essence. It increases the primitive quantity of hydrogen, and diminishes the normal proportion of oxygen by producing carbonic acid.

For the most part, freshly distilled essences slightly reproduce the perfume of the flowers from which they are extracted, and later on recall it more perfectly, owing to the oxidising influence of the air.

Certain essences, neroli for example, do not smell like the flower which yields them. But in the process known as *enfleurage*—that is to say, when we effect the absorption of the fresh odour of orange flowers by a fatty body, and then by means of alcohol withdraw the odorous principle from such body, separating it afterwards from the alcohol by distillation—we obtain a neroli, the odour of which is precisely the same as that of the flower. In this process there is no intervention of watery vapour to destroy the essence.

It is certain that the neroli thus obtained reproduces the actual smell of orange flowers; while that obtained by distillation has an entirely different smell, recalling the smell of freshwater fish.

It has been demonstrated by the very interesting researches of several chemists, and particularly by those of MM. Blanchet and Sell, Deville and others, that essences enter into definite combinations with water, their physical properties and especially their odour being at the same time modified. But it happens likewise that essences are chemically modified by water. Neroli thus differs altogether in properties and in composition, not only from the essence of orange flowers extracted by *enfleurage* or by sulphuret of carbon, but also from the same essence isolated from water distilled from orange flowers by means of ether. We are obliged, therefore, to recognise a great difference between neroli and the essence of orange flowers properly so called; and it is probable, indeed, that the solid crystallisable oil extracted from neroli by Plisson, and to which he gave the name of *auratte*, is really a hydrate. It is manifest that

essences when exposed to contact with the air are oxidised, and take the form of resins.

I have resorted to the process of *enfleurage* for the purpose of obtaining several very rare essences, and others which had not previously been isolated, such as those of tuberose, jasmine, acacia, and violet. In a chemical point of view these essences possess a very high interest; *and I am studying them at the present time.*

I believe that any two bodies which have the same odour are the same. In fact, two bodies differing in composition have not the same odour; and if it be so, I am in hope soon to extract essence of violet from iris root, which has exactly the same odour.

Nevertheless, this principle of identity of odour and of physical properties in bodies agreeing in chemical composition is far from being absolute. We could cite numerous examples of the contrary among the substances which are called by chemists *isomeric*; but we shall confine ourselves to mentioning athyl-formic ether and methyl-acetic ether, which contain the same elements and in the same proportions, and which nevertheless possess quite different odours. The great group of hydro-carbonated essences likewise presents many examples of these singular facts.

Dr. Gladstone and the Rev. F. P. Dale have been engaged in researches on the optical properties of various essences; and as their results may be useful, I feel bound to give them a place in these pages. In the table printed on p. 40 are given the physical properties of raw essences, their specific gravity at a temperature of 15°.5, indices of refraction for the rays A D and H (or G, when the yellow tint of the liquid renders H indistinguishable), and their rotatory force in the plane of polarisation. The last-named property is given for a tube $0^{m}.25$ in length. Whenever it was necessary for any reason to employ a shorter tube, the requisite reduction has been

made. Thus essence of fennel leaf was actually observed in a tube of $0^m.125$, in which it gives 103° right-hand rotation, but it has been inserted as giving 206°. A solution of the same length, composed of equal weights of cane sugar and water, gives a rotation of 105°. Temperature also was observed in all the later experiments of this kind; but the results are not inserted here, because another column must have been added; a difference of a few degrees appears to make a scarcely appreciable change in the rotatory force of the essences which were the subjects of the investigation.

Optical Properties of Essences.

Crude Essences	Specific Gravity at 15°.5	Indices of Refraction				Rotation
		Temp.	A	D	H	
		°				°
Anise	9852	10.5	1.5433	1.5566	1.6118	− 1
Victoria sassafras	1.0425	14	1.5172	1.5274	1.5628	+ 7
Laurel	8808	18.5	1.4944	1.5022	1.5420	− 6
Bergamot	8825	22	1.4559	1.4625	1.4779 G.	+ 23
Florence bergamot	8804	26.5	1.4547	1.4614	1.4760 G.	+ 40
Birch bark	9005	8	1.4851	1.4921	1.5172	+ 38
Cajeput	9203	25.5	1.4561	1.4611	1.4778	0
Calamus	9388	10	1.4965	1.5031	1.5204 G.	+ 43.5
Hamburg calamus	9410	11	1.4843	1.4911	1.5144	+ 42 ?
Caraway	8845	19	1.4601	1.4671	1.4886	+ 63
Hamburg caraway 1st dist.	9121	10	1.4829	1.4903	1.5142	—
— 2nd dist.	8832	10.5	—	1.4784	—	—
Cascarilla	8956	10	1.4844	1.4918	1.5158	+ 26
Cassia	1.0297	19.5	1.5602	1.5748	1.6243 G.	0
Cedar	9622	23	1.4978	1.5035	1.5238	+ 3
Cedra	8584	18	1.4671	1.4731	1.4952	+ 156
Balm-mint	8908	21	1.4599	1.4659	1.4866	− 4
Penang balm-mint	8847	15.5	1.4604	1.4665	1.4875	− 1
Clove	1.0475	17	1.5213	1.5312	1.5666	− 4
Coriander	8775	10	1.4592	1.4652	1.4805 G.	+ 21 ?
Cubeb	9414	10	1.4953	1.5011	1.5450 G.	—
Fennel	8922	11.5	1.4764	1.4834	1.5072	+ 206
Elder	8584	8.5	1.4686	1.4749	1.4965	+ 14.5
Eucalyptus amygdalinus	8812	13.5	1.4717	1.4788	1.5021	− 136
Oily eucalyptus	9322	13.5	1.4661	1.4718	1.4909	+ 4

Crude Essences	Specific Gravity at 15°.5	Indices of Refraction				Rotation
		Temp.	A	D	H	
		°				°
Indian Geranium .	9043	21.5	1.4653	1.4714	1.4868 G.	− 4
Lavender . . .	8903	20	1.4586	1.4648	1.4862	− 20
Lemon . . .	8498	16.5	1.4667	1.4727	1.4946	+164
Andropogon . .	8932	24	—	1.4705	—	− 3 ?
Penang andropogon .	8766	13.5	1.4756	1.4837	1.5042	0
Melaleuca ericifolia .	9030	9	1.4655	1.4712	1.4901	+ 26
— linarifolia . .	9016	9	1.4710	1.4772	1.4971	+ 11
Mint	9342	19	1.4767	1.4840	1.5015 G.	−116
—	9105	14.5	1.4756	1.4822	1.5027	− 13
Myrtle . . .	8911	14	1.4623	1.4680	1.4879	+ 21
Myrrh . . .	1.0189	7.5	1.5196	1.5278	1.5472 G.	−136
Neroli . . .	8789	18	1.4614	1.4676	1.4835 G.	+ 15
—	8743	10	1.4673	1.4741	1.4831 F.	+ 28
Nutmeg . . .	8826	24	1.4644	1.4709	1.4934	+ 44
Penang nutmeg . .	9069	16	1.4749	1.4818	1.5053	+ 9
Orange-peel . .	8509	20	1.4633	1.4699	1.4916	+ 32 ?
Florence orange-peel .	8864	20	1.4707	1.4774	1.4980	+216
Parsley . . .	9926	8.5	1.5068	1.5162	1.5417 G.	− 9
Patchouly . . .	9554	21	1.4990	1.5050	1.5194 G.	—
Penang patchouly .	9592	21	1.4980	1.5040	1.5183 G.	−120
French patchouly .	1.0119	14	1.5074	1.5132	1.5202 F.	—
Peppermint . .	9028	14.5	1.4612	1.4670	1.4854	− 72
Florence peppermint .	9116	14	1.4628	1.4682	1.4867	− 44
Petit grain . . .	8765	21	1.4536	1.4600	1.4808	+ 26
Rose	8912	25.5	1.4567	1.4627	1.4835	− 7
Rosemary . . .	9080	16	1.4632	1.4688	1.4867	+ 17
Rosewood . . .	9064	17	1.4843	1.4903	1.5113	− 16
Sandalwood . . .	9750	24	1.4959	1.5021	1.5227	− 50
Thyme . . .	8843	19	1.4695	1.4754	1.4909 G.	—
Turpentine. . .	8727	13	1.4672	1.4732	1.4938	− 79
Verbena . . .	8842	20	1.4791	1.4870	1.5059 G.	− 7
Winter-green . .	1.1413	15	1.5163	1.5278	1.5737	+ 3
Absinthe . . .	9122	18	1.4631	1.4688	1.4756 F.	—

This table shows that in the specific gravity of these crude essences there is hardly any perceptible variation, this property being in most cases O G. The index of refraction for the greater number of them falls for A between 1.46 and 1.5, the length of the spectrum, which is the difference between the indices of refraction of H and A, or $\mu^{H}-\mu^{A}$, being generally about 0.028. But the essences of parsley, sassafras, myrrh, winter-green, clove, anise, and cassia, appear to have

more refracting and dispersive power, and at the same time to have a higher specific gravity. The essence of cajeput has less influence on rays of light than any other.

The column of circular polarisation, on the other hand, reveals the greatest differences among these essences in degree and direction of rotation. But I doubt whether this characteristic can be much relied on for distinguishing essences; for it is found that the rotation of different samples of the same essence varies considerably, and this not only in the crude state, but even when the operation is conducted on pure hydrocarburets.

Name of Essences	Temp.	Densities	Rotatory Force	Indices of Refraction
Essence of bitter almonds	+12°	1.059	$(a)j = 0$	1.550
„ pure aspic	+12	—	= +3.30	—
„ bergamot	+12	0.868	= +18.45	1.468
„ camomile	+12	0.881	= +48.80	1.462
„ Chinese cinnamon	+12	1.064	= 0	1.593
„ Ceylon cinnamon	+12	1.033	—	1.563
„ caraway	+12	0.916	+87.33	1.493
„ cedra	+12	0.855	+88.88	1.478
„ lemon	+12	0.851	+87.05	1.479
„ copaiva	+12	—	−17.33	—
„ fennel	+12	0.984	+8.13	1.555
„ juniper	+12	0.879	−14.79	1.495
„ clove	+12	1.542	= 0	1.061
„ lavender	+12	0.886	−21.20	1.467
„ English peppermint	—	0.904	−34.29	1.469
„ French peppermint	—		−14.30	
„ penny-royal	—	—	+25.07	—
„ nutmegs	—	0.874	+34.28	1.483
„ neroli	—	—	+10.25	—
„ orange (Paris flowers)	—	0.887	—	1.482
„ „ (flowers of the South)	—	0.878	—	1.478
„ „	—	0.847	—	1.477
„ petit grain	—	—	+20.47	—
„ Portugal	—	—	+105.20	—
„ rosemary	—	0.896	+14.67	1.475
„ sandalwood citrine	—	0.975	−24.30	1.514
„ sassafras	+12	1.087	+2.45	1.541
„ sage	—	0.896	−8.93	1.475
„ turpentine	—	0.867	−43.50	1.476
„ thyme	—	0.890	−11.23	1.483

Nevertheless, it may be possible to avail ourselves of some of these physical characters for detecting the fraudulent mixture of essences. Thus, by addition of the essence of turpentine, specific gravity would in almost all cases be diminished, and the spectrum shortened. On the other hand, the essence of pure bergamot has a feeble refraction, certainly more feeble than the mixtures frequently sold under its name. The index of refraction of D has been purposely included in the above table, because this ray can always be obtained from daylight, or more conveniently from the flame spirit of wine combined with a salt. Any instrument-maker might easily devise a simple apparatus for thus testing samples of essences.

These crude essences have been submitted to fractional distillation in order to separate their constituent principles. The hydrocarburets thus rectified had, moreover, been purified by repeated distillation with sodium. This alkaline metal generally combines with oxydated essences to form a resinous non-volatile substance ; but it is impossible to assert that a new hydrocarburet is ever yielded. Some of these compounds containing oxygen—for example, those of different species of *melaleuca*—may be distilled with sodium without undergoing any change.

The figures contained in the preceding table differ widely from those obtained by M. Buignet.[1] These differences depend on the degrees of purity of the essences. Those used in the experiments of the learned professor of the school of pharmacy, having been prepared by himself, his results are entitled to our confidence. We may remark, however, that in the preceding table the operations were conducted at variable temperatures ; while the results given in the following table were obtained for all the operations at + 13°.

[1] *Journal de Pharmacie et de Chimie*, 3rd series, 1861. Vol. xi., pp. 261, 64, and 331.

M. Buignet extended his experiments to the fixed oils. As these are frequently employed in perfumery, and as their physical and optical properties are but little known, we give below the results of M. Buignet's experiments, adding to them the statement of densities.

Names of Oils	Densities	Index of Refraction A + 22° for the Green Ray	Rotatory Force A + 15° for the Red Ray
Oil of sweet almonds . . .	0.918 + 15	1.471	$(a)r = 0$
„ bitter almonds . . .	—	—	0
„ ben	—	—	0
„ colza	0.913	1.475	—
„ beech-nut	0.922	—	0
„ cod-liver (golden) . .	0.928	—	0
„ „ (white). . .	0.920	1.481	0
„ skate	0.928	1.486	−0.20
„ dogfish	—	1.481	0.82
„ flax	0.939	1.481	—
„ black mustard . . .	0.917	—	0
„ rape seed	0.912	1.475	0
„ walnut.	0.928	1.477	0
„ hazel-nut	0.924	1.470	0
„ olives	0.919	1.470	0
„ poppies	0.924	1.479	0
„ fish	—	1.474	0
„ castor-oil plant . . .	0.969	1.481	+ 3.63

From this table it appears that for the fixed oils, castor oil excepted, the rotatory force is *nil.* Of this fact we can avail ourselves for the recognition of certain frauds; for example, the adulteration of copaiva with castor oil. On the other hand, almost the whole series of essences possess a rotatory force, with which it is very interesting to compare their energy.

All the essences of the *aurantiaceæ* are right-handed, and in the highest degree, and essences derived from the different parts of one and the same plant are quite different. The essences of labiated plants, with the exception of rosemary,

cause the plane of polarisation to deviate towards the left; and essences from plants of the genera *mentha* and *lavandula* do not act in the same direction as those of peppermint and lavender.

The essences of caraway and fennel, derived from the fruits of two *umbelliferæ*, are both right-handed; and the essences of turpentine and juniper, both *coniferæ*, act in the same direction. But, strange to say, the essence of common turpentine from *Pinus Tæda* acts in a reverse direction.

Scents, like sounds, appear to influence the olfactory nerve in certain definite degrees. There is, as it were, an octave of odours like an octave in music; certain odours coincide, like the keys of an instrument. Such as almond, heliotrope, vanilla, and clematis blend together, each producing different degrees of a nearly similar impression. Again, we have citron, lemon, orange peel, and verbena, forming a higher octave of smells, which blend in a similar manner. The analogy is completed by what we are pleased to call semi-odours, such as rose and rose-geranium for the half note; petty grain, neroli, a black key, followed by fleur d'orange. Then we have patchouly, santalwood and vitivert, and many others running into each other. 'Chambers's Journal,' reviewing the first edition of this work, says, in reference to this remark of ours, that—

> We know that music depends upon a fixed mathematical law, not invented by man, but existing in nature. Nature is not a prodigal in her operations—she is no waster of power: the better she is understood, the more simple she appears; and there is nothing, therefore, contrary to sound reason in the idea, that the whole of the pleasures of the sense of smell will be found to depend upon cognate laws.

From the odours already known, we may produce, by uniting them in proper proportion, the smell of almost any flower, except jasmine. Reviewing an early edition

of this book in 'Household Words,' July 3, 1857, Dickens says :—

> Is jasmine, then, the mystical Merù—the centre, the Delphi, the Omphalos of the floral world? Is it the point of departure—the one unapproachable and indivisible unit of fragrance? Is jasmine the Isis of flowers, with veiled face and covered feet, to be loved of all, yet discovered by none? Beautiful jasmine! If it be so, the rose ought to be dethroned, and the Inimitable enthroned queen in her stead. Revolutions and abdications are exciting sports; suppose we create a civil war among the gardens, and crown the jasmine empress and queen of all?

The odours of some flowers resemble others so nearly, that we are almost induced to believe them to be the same thing, or at least, if not evolved from the plant as such, to become so by the action of the air-oxidation. It is known that some actually are identical in composition, although produced from totally different plants, such as camphor, turpentine, rosemary. Hence we may presume that chemistry will sooner or later produce one from the other, for with many it is merely an atom of water or an atom of oxygen that causes the difference. It would be a grand thing to produce otto of roses from oil of rosemary, or from the rose geranium oil; and theory indicates its possibility.

The essential oil of almonds in a bottle that contains a good deal of air-oxygen, and but a very little of the oil, spontaneously passes into an inodorous body, benzoic acid; which is seen in crystals to form over the dry parts of the flask. This is a natural illustration of this idea.

To the 'unlearned' nose all odours are alike; but when tutored, either for pleasure or profit, no member of the body is more sensitive. Wine merchants, tea brokers, drug dealers, tobacco importers, and many others have to go through a regular nasal educational course. A hop merchant buries

his nose into a pocket, takes a sniff, and then sets his price upon the bitter flower.

The odours have to be remembered, and it is noteworthy here to remark with what persistence odours do fix themselves upon the memory; and were it not for this remembrance of an odour, the merchants in the trades above indicated would soon be at fault. An experienced perfumer will have two hundred odours in his laboratory, and can distinguish every one by name. Could a musician, with an instrument of two hundred notes, distinguish and name any note struck, without his seeing the instrument?

In the following gamut I have endeavoured to place the name of the odour in its position corresponding to its effect upon our olfactory sense.

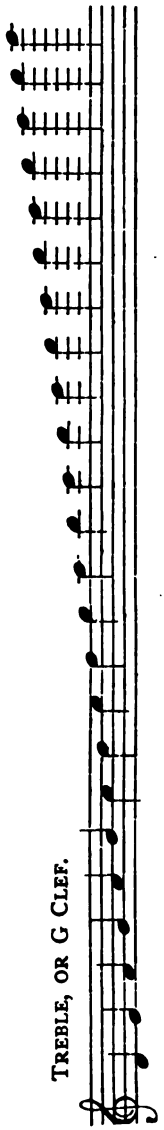
I have purposely chosen those odours which are more especially used in perfumery; but I wish it to be understood that all odours, from whatever source derived, may be similarly classified. I know of no odour in a chemical laboratory —and they are pretty numerous—to which I could not assign its corresponding key.

There are odours to which neither sharps nor flats are known, and there are others which would almost form a gamut in themselves by their variety of differences. The most numerous class of odours in nature are of the lemon character.

If a perfumer desires to make a bouquet from primitive odours, he must take such odours as chord together; the perfume will then be harmonious. In passing the eye down the gamut it will be seen what is a harmony and what is a discord of smells. As an artist would blend his colours, so must a perfumer blend his scents.

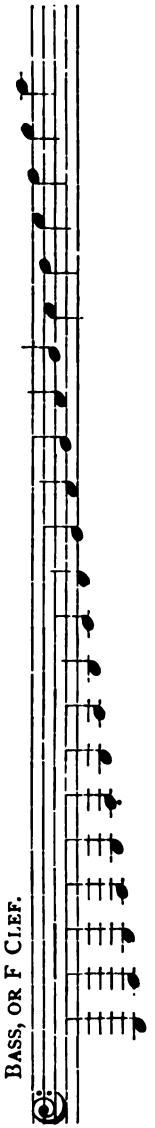
In making several perfumes for choice they must be so mixed as to form a contrast when side by side.

THE GAMUT OF ODOURS.



F Civet.
E Verbena.
D Citronella.
C Pineapple.
B Peppermint.
A Lavender.
G Magnolia.
F Ambergris.
E Cedrat.
D Bergamot.
C Jasmine.
B Mint.
A Tonquin Bean.
G Syringa.
F Jonquille.
E Portugal.
D Almond.
C Camphor.
B Southernwood.
A Vernal Grass (new Hay).
G Orange Flower.
F Tuberose.
E Acacia.
D Violet.

THE GAMUT OF ODOURS.



C Rose.
B Cinnamon.
A Tolu.
G Sweet Pea.
F Musk.
E Orris.
D Heliotrope.
C Geranium.
B Stocks and Pinks.
A Balsam of Peru.
G Pergalaria.
F Castor.
E Calamus.
D Clematis.
C Santal.
B Clove.
A Storax.
G Plumeria Alba (Frangipanni Plant)
F Benzoin.
E Wallflower.
D Vanilla.
C Patchouly.

The complementary of vanilla is citronella. The following recipes will give an idea how to make a bouquet according to the laws of harmony :—

Bass.

G	Pergalaria.	Bouquet of chord G.
G	Sweet Pea.	
D	Violet.	
F	Tuberose.	
G	Orange Flower.	
B	Southernwood.	

Treble.

Bass.

C	Santal.	Bouquet of chord C.
C	Geranium.	
E	Acacia.	
G	Orange Flower.	
C	Camphor.	

Treble.

Bass.

F	Musk.	Bouquet of chord F.
C	Rose.	
F	Tuberose.	
A	Tonquin Bean.	
C	Camphor.	
F	Jonquil.	

Treble.

In making a bouquet, every primitive odour must be brought to some standard of strength, or 'power of odour.' Thus, the standard of spirit of roses is, three ounces of otto rose to one gallon of spirit. But the standard of geranium is eight ounces of otto geranium to one gallon of spirit—the ottos differing in 'power of odour' as three is to eight. Electricians make a clear difference between 'intensity' and 'quantity;' verbena may be cited as indicating the former,

vanilla as the latter. Camphor is three times more intense than rose.

There is a property in sound and in light, says Sir David Brewster, too remarkable to be passed without notice. 'Two loud sounds may be made to produce silence, and two strong lights may be made to produce darkness.'

A similar analogy exists in the most *powerful odours.* Concentrated ammonia and concentrated acetic acid neutralise each other, and produce an *inodorous body.* It will be said, here is chemical combination,—admitted; but the odours, now lost, can be readily reproduced in their natural potency. Several of our poets have been singularly happy in their allusions to the analogy which exists between music and odour. Thus Keats says:—

> Heard melodies are sweet, but those unheard
> Are sweeter.

Again Shelley sang thus:—

> The hyacinth, purple, and white, and blue,
> Which flung from its bells a sweet peal anew
> Of music so delicate, soft, and intense,
> It was felt like an odour within the sense!

Who does not remember the line in Shakspeare:—

> It fell upon mine ear
> Like the sweet south, stealing and giving odour.

See also Calder Campbell's lines, 'A fragrant orchestra,' p. 147.

Professor Newman has remarked that there is a point at which all sciences osculate. This becomes more apparent daily. The chemist must be a mathematician; so must the thorough musician. Optics have lately come to the aid of chemistry; and the most recent discovery, the metal thallium, revealed itself to our knowledge by a line of intense green light upon the spectrum. Thus, again, chemistry aids astronomy; the spectrum analysis, dealing with the solar and stellar light, enables us at least to conjecture what elements exist in other spheres of the universe. What shall we say of Piesse's theory, which finds close analogy between scents and musical notes?

'There is a "continuity" pervading the universe; everything gives proof of it.' These were the words of Judge Grove when he was President of the British Association. This is clearly but another expression of my argument—that there is a union between the senses of taste and smell on one hand, and between sound and smell on the other, which indicates their 'continuity.'

Where there are disagreeable odours, and it is at the same time impossible to get rid of them by an air current, the best neutraliser is another odour. For this purpose, and with what beneficial result brown paper is burned now and then in our homes, is well known.

In this way the cadaverous odours of our old cathedrals and abbeys, formerly used as burial-places, were overcome with the vapour of incense; not merely masked, as some persons assert, but neutralised by combination.

Pestiferous emanations are all of an alkaline, if not ammoniacal character, and readily combine with the products of slow combustion, all of which are acid, or have an acid character in their chemical reactions. Those subtle emanations which engender disease, whether derived from the malarious swamp, or as effete matter from the lungs of a disordered person, are at once destroyed by the odorous vapours resulting from slow combustion.

To us it appears that the phenomenon of disinfection by gases, vapours, or products of combustion, is a far more complex process, and that it is difficult to make a satisfactory generalisation on the subject. In some cases all that is done is the dispersion of a bad odour by a wholesome one, or by one less bad; but then there is no disinfection properly so called. It is simply the temporary displacement of one odour by another. In other cases, real chemical combinations take place between different odorous bodies, and new inodorous compounds are produced; as, for example, the saturation of ammonia by acetic acid, or that of the sulphydrate of am-

monia by sulphate of iron. Or again there may be a condensation of odorous bodies by porous bodies, as in the case of charcoal. But in some cases the odorous substances are completely destroyed. This appears to be effected by chlorine, nitrous vapours, &c. Lastly, there are some antiseptic agents which act by exhausting or diminishing the source of infection.

Benzoin is the principal ingredient in all the vended combustions for sweet fumigation. This yields by heat the highly volatile benzoic acid : in default of having matter with which it can combine, it will, when diffused in a house, cling to the walls and penetrate every nook and cranny.

From what we have just said it follows that the odorous body in this case is not benzoic acid itself, but some peculiar essential or fatty matter which accompanies the combustion of benzoin.

Fever may have its own in one chamber ; but it will rarely penetrate another room, even in the same house, if there be an occasional sacrifice of incense.

The smell of burning flesh is most revolting,—no wonder the Romans burnt incense at the funeral pile.

Perhaps it was the bad smell of a burning heretic that induced us to quench the martyrs' fire ; for England had no incense in those days.

Here, again, the phenomenon of disinfection is complex. The burning of incense or of other analogous bodies, for the purpose of disinfection, acts in one of the following ways :— 1st, by producing aromatic vapours which mask the ill odours ; 2nd, by setting up a current of air and thereby a slight ventilation ; 3rd, by producing various acids which may neutralise the infectious bodies, gaseous, alkaline, or at least basic ; or 4th, by forming aromatic products which prevent the fresh formation of infectious products.

Recent researches, especially those of Professor Mante-

gazza, communicated to the Institute of Lombardy, would seem to show that the ancients, after all, were by no means following merely imaginative or superstitious speculations in the practice they adopted of attempting, by the free use of odoriferous substances, to guard themselves against the attack of infectious diseases. This subject was deemed of sufficient importance to be referred to in the opening remarks of the presiding chairman of the public health section of the recent British Medical Association, and as one deserving of careful study. Whether we shall, however, ever recur to the practice of Acron, of Agrigentum, and other followers of Empedocles, the physicist who not only used aromatic and balsamic herbs as preventives of pestilence, oftentimes planting them in abundance, for that purpose, round their cities, or adopt a similar course to that followed in a plague that once devastated Italy, when, acting on the advice of the faculty of the day, strangers crowding into Rome retreated to Lauretum, now San Laurenzo, that by a cooler atmosphere and by the odour of laurel they might escape the chance of infection, we cannot pretend to say. But it would really seem that we may, with increased confidence, rely upon our camphor bags, our lavender bundles, and the like, for Mantegazza says that in the oxidation of the essences of odoriferous plants a large quantity of ozone is evolved, at least as much as is generated by electricity or phosphorus, the ozone being developed by the direct action of the sun's rays, and in some cases whilst this commences in solar light it continues in the dark. The plants which give most ozone readily are cherry-laurel, clove, and lavender; among herbs, the narcissus, hyacinth, and mignionette; and amongst perfumes, eau Hongroise, oil of bergamot, and certain aromatic tinctures. The cultivation of herbs and odorous flowers, 'in marshy districts and in places infected with animal emanations,' is the advice which Mantegazza gives.

Although tastes do differ, yet is worthy perhaps of being recorded—namely, that the scents which are most liked by youth are of lower bass note, while that of age prefer the upper treble.

There are notably many persons who are Anosmic ; that is, wanting the power of smelling : to such all odours are alike. 'Noses have they, but they smell not ;' they resemble persons who are deaf because they cannot hear, or others blind because they cannot see. Anosmia is far more prevalent from the habit of not using the nose as a faculty than from its original purpose. On the other hand, there are persons who are Hyper-Osmic, that is, very sensitive to smelling. Of such are the Kingdom of Fragrance and the Earthly Sanitary inspectors of nuisances.

ODOURS OF THE EARTHS.

All those materials, which are distinguished in ordinary conversation as earths, give out a peculiar and characteristic odour immediately they are wetted with water. Every pedestrian on the high-road in the country, during the summer months, being 'caught in a shower,' must have remarked the delightful fragrance that fills the air a few minutes after the rain has fallen, and then passes away. When chalk, or rather whiting, is mixed with water, an odour is evolved which is very persistent, but by no means fragrant to every nose ; again, oxides of iron, manganese, and many other bodies in the category of earthy substances, give out odour when wetted. At present we can do no more than simply record the fact, without entering into speculation as to the cause of these phenomena, without indeed it be of a negative kind, in stating that these odours are certainly not due to any matter in the water prior to its touching the earth, for the same result has been noticed when the purest distilled water has been used for the purpose of the experiment ; neither can the observation be confined

solely to earth and water, for when hydrochloric acid is poured on to oxide of zinc, there is a pleasant odour given out, as a by-product of the combination which then takes place between the acid and zinc, or more probably by the formation of a new hydrocarbon between the H of the HCl and the minute portion of C or of As found in commercial zinc.

The disengagement of these odours from the earths is owing to the presence of organic matters, or of odorous gases absorbed by porous earths and displaced by water. With respect to the odour disengaged when zinc is treated with hydrochloric acid, the explanation may be various, according to circumstances.

COLOURING PRINCIPLE OF THE VOLATILE OILS.

Gmelin has with great accuracy expounded all that was known in his day about the composition of essences. Since that time these bodies have been studied by a great number of chemists, among whom we may name MM. Bonastre, Piria, Cahours, Deville, Berthelot, Chaulard, &c.

The study of the colouring matter of essences has led me to the discovery of a body which I have named *azulene*. The facts ascertained respecting it are the following.

It is generally known that the essences or essential oils of vegetable bodies are characterised by particular colours, —yellow, blue, green, brown, or white, *i.e.* colourless.

In my investigations respecting the substances to which these colours are owing, I have, I believe, discovered their nature, and I will here set forth the particulars established. The most interesting among them is the blue substance which colours the essence of camomile, for it reappears in other volatile oils, and imparts to them a green colour under the disguise of a yellow resin, which occurs also in the green

volatile oils. When the blue essence of camomile is submitted to fractional distillation, it is easy to separate the colourless hydrocarbon of anthemidine [1] from the blue colour, because the latter requires a much higher temperature for its vaporisation than the former.

By the fractional distillation of the essence of wormwood, or of absinthe, I obtain first an almost colourless hydrocarbon; at the third fractionnement, an oil of a fine green colour, which, at the fifth, separates into a blue oil and a residuum of a yellow colour. By submitting to fractional distillation some essence of patchouly distilled from the leaves of the Indian plant, *Pogostemon Patchouly*, I likewise obtain first a colourless hydrocarbon; afterwards, but not till the eleventh fractionnement, a fine blue oil and a yellow brown residuum. The necessity for so many fractional repetitions for the separation of the blue oil arises from the fact that the boiling points of the patchouly hydrocarbon, of the blue oil and of the resin, are all very high, and very nearly the same.

The essence of bergamot, extracted from the rind of the fruit of *Citrus Bergamo*, and the essence of *Andropogon Schœnanthus* (Ceylon lemon grass) when treated in the same way, yield small quantities of this blue substance.

On several occasions, when rectifying the blue liquid extracted from these various essences, I have succeeded in freeing it from all foreign substances and in bringing it to a state of perfect purity. It then boils at a temperature of 302° centigr.; and its specific gravity is 0.910. When raised to boiling point it gives out a dense vapour of a blue colour, which presents some special characteristics to the eye. This substance I have named *azulene* (from *azure*). The analysis of azulene gives the following formula:—

[1] The principle of the essence of camomile (*Anthemis nobilis*).

	Calculated	Actual
C^{12}	82.05	81.21
H^{13}	11.10	10.95
O	6.85	7.84
	100.00	100.00

Or $C^{12}\ H^{12} + HO$.

The yellow colouring matter which gives its tinge to various essences appears to be an oxidised part of them. In almost all cases, essences, though colourless immediately after their extraction, become yellow by lapse of time ; that is to say, by oxidation. This change, however, is not universal ; for essence of nutmeg remains colourless for a long time, even when air is introduced by suction. The oxidised portion of oils coloured yellow, when separated from the pure oil in which it is dissolved, is a real resin. As most essences get oxidised during distillation, it happens that their colour varies from pale yellow to deep red. Most essences when fresh—that is to say, newly distilled—are of a pale green colour, which indicates the presence of azulene ; but as oxidation proceeds, the yellow resin produced covers the azulene. Hence we have—

A. Colourless essences containing neither azulene nor resin.

B. Yellow essences containing only resin.

C. Blue essences containing only azulene.

D. Brown, green, and yellow-green essences containing both azulene and resin in various proportions, as indicated by optical examination.

It is remarkable how small a quantity of azulene is sufficient to colour an essence in which no yellow resin is present. The oil of camomile, the blue colour of which is familiar to us, contains only 1 per cent. of azulene. But the essence of patchouly, which contains 6 per cent., and that of wormwood, which contains 3 per cent., do not look blue at all, in consequence of the large quantity of yellow resin present in

them. In the fractional distillation of wormwood, at the third fractionnement, yellow resin and azulene are present in the necessary proportions for forming a green solution. This probably occurs also in the case of other oils known for their green colour, such as oil of cajeput, but these I have not yet investigated.

The chemical examination of azulene and of the part which it plays in combination with odorous bodies will soon furnish me, I hope, with new facts, which I propose laying before the public.

G. E. Sachsse says :[1]—

It is well known that most ethereal oils are colourless ; however, there are a great number coloured, some of which are blue, some green, and some yellow. Up to the present time the question has not been decided whether it is the necessary property of ethereal oils to have a colour, or whether their colour is not due to the presence of some colouring matter which can be removed. It is most probable that their colour arises from the presence of a foreign substance, as the coloured ethereal oils can at first, by careful distillation, be obtained colourless, whilst later the coloured portion passes over. Subsequent appearances lead to the solution of the question, and are certain evidence that ethereal oils, when they are coloured, owe their colour to peculiar substances which, by certain conditions, may be communicated from one oil to another. When a mixture of oils of wormwood, lemons, and cloves is subjected to distillation, the previously green-coloured oil of wormwood passes over, at the commencement, colourless ; while, towards the end of the distillation, after the receiver has been frequently charged, the oil of cloves distils over in very dense drops of a dark green colour. It therefore appears that the green colouring matter of the oil of wormwood has been transferred to the oil of cloves.

[1] *Zeitschrift für Pharmacie.*

SECTION III.

Were not summer's distillations left
A liquid prisoner, pent in walls of glass,
Beauty's effect of beauty were bereft,
Nor it, nor no remembrance what it was;
But flowers distilled, though they with winter meet,
Leese but their show, their substance still lives sweet.

SHAKSPEARE.

FLOWERS yield perfumes in all climates, but those growing in the warmer latitudes are most prolific in their odour, while those from the colder are the sweetest. Hooker, in his travels in Iceland, speaks of the delightful fragrance of the flowers in the valley of Skardsheidi: we know that winter-green violets and primroses are found here, and the wild thyme in great abundance. Mr. Louis Piesse, in company with Captain Sturt, exploring the wild regions of South Australia, writes:—'The rains have clothed the earth with a green as beautiful as a Shropshire meadow in May, and with flowers, too, as sweet as an English violet; the pure white anemone resembles it in scent. The yellow wattle, when in flower, is splendid, and emits a most fragrant odour.'

A writer in Upper Canada says:—

By the way, I send you herewith a withe or two of our 'Indian grass,' whose delicious scent you will not fail to remark. . . . You have nothing of the kind in England to compare with it, and I wonder your perfumers do not use it. It's very plentiful here.

Every country and clime offers up its ripened odours from the earth to the Most High. The mighty and majestic Alps are redolent with

choicest aromatics ; the frigid zone is sumptuous with rarest perfumes ; that wrinkled and garrulous old grey-beard, Ocean, lavishes up ambergris on his sands ; the hottest region, the torrid zone, regales the senses with their concentrated volatile spirits, constituting the delicious *aroma* of their divers products, unknown to chymical analyses.—FORSTER KER.

Though many of the finest perfumes come from the East Indies, Ceylon, Mexico, and Peru, the South of Europe is the only real garden of utility to the perfumer. Grasse,[1] Cannes,[2] and Nice are the principal seats of the art ; from their geographical position, the grower, within comparatively short distances, has at command that change of climate best fitted to bring to perfection the plants required for his trade. On the seacoast, his cassie grows without fear of frost, one night of which would destroy all the plants for a season ; while, nearer the mountains of the Estrelle (at the foot of the Alps), his violets are found sweeter than if grown in the warmer situations, where the orange tree and the tuberose bloom to perfection. England can claim superiority in the growth of

[1] Grasse is situated twelve miles north of Cannes, rising considerably from the sea up the Estrelle Mountains. It contains a population of about 12,000. Here is situated the great perfumery works of MM. Pilar, frères.

[2] Cannes, or Cagnes, is a small seaport on the Mediterranean, at the S.E. extremity of France. Here Napoleon I. landed from Elba on the 1st of March, 1815. It is situated twenty-one miles from Nice, nine miles from Grasse, 120 miles from the port of Marseilles, and fourteen miles from the Var, which till the cession of Savoy by Victor Emmanuel separated France from Sardinia. This river is crossed by a long wooden bridge, which is not unfrequently washed away by the overwhelming torrents, which bring with them enormous masses of stone and other matter, ultimately received by the sea. On each side of this bridge were (1860) the French and Sardinian Custom-houses. Cannes is sometimes termed an 'English colony,' from its having become the winter abode of several distinguished persons, among them the Right Hon. Lord Brougham, whose residence is the Château Eleanora Louisa, so named after his lordship's late daughter, to whose memory it is dedicated, and on the subject of whose loss the most feeling verses by Lord Carlisle, Marquis Wellesley, and her father, are inserted in the interior walls. She died at the age of seventeen, and the deep and everlasting devotion to her memory is a touching trait in the character of the acute lawyer and brilliant statesman. Here are situated the perfumery works of M. L. Herman. The present population of Cannes is about 8,000.

lavender and peppermint; the essential oils extracted from these plants grown at Mitcham, in Surrey, and at Hitchin, in Hertfordshire, realise eight times the price in the market of those produced in France or elsewhere, and are fully worth the difference for delicacy of odour. At Cannes are produced all the products of rose, tuberose, cassie, jasmine, and orange-*neroli*. At Nîmes the cultivators direct their chief attention to thyme, rosemary, aspic, and lavender. At Nice the factors have a *spécialité* for violet and réséda. Sicily yields lemon and orange, Italy orris and bergamot.

The essence of mint prepared at the works of M. Chardin-Hadaucourt, near Paris, from plants cultivated over a large surface in the plain of Gennevilliers, combines in itself the qualities of delicacy and strength, characteristic of the Mitcham essence, and of that of the south of France. Paris holds also an indisputable superiority in the manufacture of the essences of angelica, tarragon, hyssop, wormwood, &c.

The odours of plants reside in different parts of them, sometimes in the root, as in the iris and vitivert; the stem or wood, in cedar and santal; the leaves, in mint, patchouly, and thyme; the flower, in the roses and violets; the seeds, in the Tonquin bean and caraway; the bark, in cinnamon, &c.

Some plants yield more than one odour, which are quite distinct and characteristic. The orange-tree, for instance, gives three—from the leaves one called *petit grain;* from the flowers we procure *neroli*; and from the rind of the fruit, essential oil of orange, named '*Portugal.*' On this account, perhaps, this tree is the most valuable of all to the operative perfumer. The best neroli is yielded not by the sweet orange-tree, but by the Seville. The essence extracted from its fruit is the essence of Bigarade, and not that of Portugal, which is derived from the sweet orange.

The fragrance or odour of plants is owing, in nearly all cases, to a perfectly volatile oil, either contained in small vessels, or sacs, within them, or generated from time to time, during their life, as when in blossom. Some few exude, by incision, odoriferous gums, as benzoin, olibanum, myrrh, &c.; others give, by the same act, what are called balsams, which appear to be mixtures of an odorous oil and an inodorous gum. Some of these balsams are procured in the country to which the plant is indigenous by boiling it in water for a time, straining, and then boiling again, or evaporating it down till it assumes the consistency of treacle. In this latter way is balsam of Peru procured from the *Myroxylon peruiferum*, and the balsam of Tolu from the *Myroxylon toluiferum*. Though these odours are agreeable, they are not much applied in perfumery for handkerchief use, but by some they are mixed with soap, and in England they are valued more for their medicinal properties than for their fragrance.

The odours of flowers are more generally secreted during the sunshine, or at least in the day time; but there are some which yield no odour in the day, but are very fragrant in the evening, such as the *Cestrum nocturnum*, the *Lychinis vespertina*, some of the *Catasetum* and the *Cymbidium*.

There are a few flowers which receive their specific name, *tristis*, SAD, on account of their being odoriferous only at night; such are *Hesperis tristis*, and *Nyctanthes Arbor tristis*.

In an article in the 'Journal de Pharmacie,'[1] by M. Recluz, 'on the effects of the sun's rays upon the flowers of the *Cacalia septentrionalis*,' he says:—'When the sun shines upon the flowers of this plant, they are odoriferous, but when the sun's rays are intercepted by artificial means—that is, by interposing the hand—their odour quickly disappears, but their fragrance returns as rapidly when the shade is removed.'

Marren states, as quoted by Dr. Balfour, that the flowers

[1] Page 216, 1827.

of the *Habenaria bifolia*, growing near Liége, which are quite scentless during the day, give out a pleasant penetrating aroma in the evening, usually about 11 P.M. He found that the perfume manifested itself at twilight, exhibiting the greatest energy at the time when the darkness of night prevailed, and decreased with the dawn. Two racines of flowers of this orchid were placed in two cylindrical glasses filled with water, in which the plants were totally submerged; one glass was placed in the sunshine, the other in the shade. As evening came on, a delicious aroma became evident, and was emitted during the night, but disappeared at sunrise. These experiments induced Marren to come to the conclusion that the odour of flowers depends on some physiological cause, and not on the evaporation of particles, nor the accumulation of them in parts of the plants where they have their origin. He found that aromatic orchids, such as the *Marillaria aromatica*, lost their perfume half an hour after the application of pollen had been artificially made, and that the unfertilised flowers retained their odour the longest time.

M. Trinchinetti, who has also experimentalised on the odours of plants, divides odoriferous flowers into two classes:—

1. Those in which the intermission of odour is connected with the opening and closing of the flower; and in this class there are two subdivisions.

A. Flowers which are closed and scentless during the day, and are open and odoriferous at night, such as *Mirabilis jalapa*, *M. dichotoma*, *M. longiflora*, *Datura ceratocaula*, *Nyctanthes Arbor tristis*, *Cereus grandiflorus*, *C. nycticalus*, *C. serpentinus*, *Mesembryanthemum noctiflorum*, and some species of *Silene*.

B. Flowers which are closed and scentless during the night, and are open and odoriferous during the day, such as *Convulvulus arvensis*, *Cucurbita Pepo*, *Nymphæa alba*, and *Nymphæa cærulea*.

2. Flowers which are always open, but which are odoriferous at one time and scentless at another. Under this class there are two sections :—

A. Flowers always open, and only odoriferous during the day, such as *Cestrum diurnum*, *Caronilla glauca*, and *Cacalia septentrionalis.*

B. Flowers always open, but only fragrant at night, such as *Pelargonium triste*, *Cestrum nocturnum*, *Hesperis tristis*, and *Gladiolus tristis.*

The exudation of odours by nocturnal flowers sometimes takes place in a peculiarly intermittent manner. Thus, in the night-blooming *Cereus* (*Cereus grandiflorus*), the flowers are fragrant only at intervals, giving out puffs of odour every half hour, from eight in the evening till midnight. Balfour,[1] or the authority of Marren, states that on one occasion the flowers began to expand at six o'clock in the evening, when the first fragrance was perceptible in the hot-house. A quarter of an hour afterwards, the first puff of odour took place, after a rapid motion of the calyx ; at twenty-three minutes past six there was another powerful emanation of fragrance ; by thirty-five minutes past six the flowers were completely open ; at a quarter to seven the odour of the calyx was the strongest, but modified by the petals ; after this time the emanation of odour took place at the same periods as before.

Observations have been made by Cöhler and Schübler[2] in regard to odoriferous flowers as occurring in species belonging to certain orders in relation to their colours. They have formed a table of the coloured flowers, which they examined according to their odoriferous qualities, and the colours which they bear.

As will be seen by the annexed table, white flowers are the most fragrant and pleasing to the smell, while the orange and brown coloured flowers are of little use to the perfumer.

[1] Balfour's *Class-Book of Botany.* [2] Quoted by Balfour.

Colours	Species	Odoriferous	Odours agreeable	Disagreeable odours
White	1193	187	175	12
Yellow	951	75	61	14
Red	923	85	76	9
Blue	594	31	23	7
Iris	307	23	17	6
Green (?)	153	12	10	2
Orange	50	3	1	2
Brown	18	1	—	1

The *Monocotyledons* examined were found to contain 14 per cent. of odoriferous species, while the *Dicotyledons* only contain 10 per cent. In the case of the natural orders examined, the colours were associated with the odours as follows :—

Natural family	Prevailing colour	Odoriferous flowers per cent.
Water Lily family	White and Yellow	22
Rose	Red, Yellow, and White	13.1
Primrose	White and Red	12.3
Borage	Blue and White	5.9
Convolvulus	Red and White	4.13
Ranunculus	Yellow	4.11
Poppy	Red and Yellow	2
Campanula	Blue	1.31

In laying out a garden which we may desire to please us by its fragrance as well as its beauty, we cannot do better than be guided by the above facts in the selection of flowers to cultivate in it, nor can those who admire the paradisiacal perfume of a garden at evening's close neglect the growth of nocturnal flowers without losing many pleasures derived from the particles which they throw into the 'breath of life,' so subtile and ethereal withal as to be beyond the material grasp of the chemical philosopher.

The extensive flower farms in the neighbourhood of Nice,

in Savoy; Montpellier, Nimes, Grasse, and Cannes, in France; at Adrianople (Turkey in Europe); at Broussa and Uslak (Turkey in Asia); at Gazepore (India), and at Mitcham and Hitchin, in England, in a measure indicate the commercial importance of that branch of chemistry called Perfumery.

British India and Europe consume annually, at the very lowest estimate, 150,000 gallons (!) of perfumed spirits, under various titles, such as Hungary Water, Essence of Lavender, Esprit de Rose, &c. The art of Perfumery does not, however, confine itself to the production of scents for the handkerchief and bath, but extends to imparting odour to inodorous bodies, such as soap, oil, starch, and grease, which are consumed at the toilette of fashion. Some idea of the commercial importance of this art may be formed, when we state that one of the large perfumers of Cannes, M. Herman, employs annually 140,000 lbs. of orange flowers, 12,000 lbs. of cassie flowers, 140,000 lbs. of rose leaves, 32,000 lbs. of jasmine blossoms, 20,000 lbs. of violets, 8,000 lbs. of tubereuse, 16,000 lbs. of cassie, besides rosemary, mint, lemon, citron, thyme, and other odorous plants in larger proportion. In fact, the quantity of odoriferous substances used in this way is far beyond the conception of those even used to abstract statistics.

FLOWER FARMING STATISTICS.

Thirty thousand *Jasmine* plants will occupy an area of land equivalent to 1,500 metres (rather more than one-third of an acre), and will produce during the entire season, 1,000 kilogrammes[1] of flowers.

Five thousand *Rose-tree* plants will occupy 1,800 metres of land (nearly half an acre), and will produce 10 kilogrammes of rose-flowers during the season.

One hundred *Orange-trees*, at the age of 10 years, will

[1] The kilogramme is very nearly 2 lbs. 3 oz.

occupy 4,000 metres of land (one acre), and will produce, during the season, 1,000 kilogrammes of orange-flowers.

Eight hundred *Geranium* plants will occupy 2,000 metres of land, the produce of which, during the season, will be 1,000 kilogrammes of geranium-leaves.

Violets.—5,000 metres of land (1¼ acre), planted with violets, will produce 1,000 kilogrammes of violet-flowers during the season.

Tubereuse.—70,000 tubereuse-roots will produce 1,000 kilogrammes of flowers during the season, and will require 10,000 metres of land (2½ acre) for their culture.

The annual produce of violet-flowers at Nice and at Cannes amounts to 25,000 kilogrammes (Grasse does not produce violets), the annual manufacture of which into oils and pomades is 12,000 kilogrammes; if, however, the produce furnished by the different manufactures were genuine, they would not be able to produce more than 6,000 kilogrammes of the essence in its pure state from the quantity of flowers just mentioned.

Nice produces 200,000 kilogrammes of orange-flowers annually.

The produce of orange-flowers at Cannes and the adjacent villages is 435,000 kilogrammes; these are of a much superior quality and in every way better adapted for manufacture than those of Nice, which are, indeed, fit for distillation only.

One thousand kilogrammes of orange-flowers produce 800 grammes of pure neroli; 600 kilogrammes of orange-flower leaves produce 1 kilogramme of pure petit grain.

Cannes produces annually from 16,000 to 18,000 kilogrammes of cassie-flowers. It may be remarked that the cassie-flower is a product which belongs exclusively to the soil of Cannes, as the tree which produces it will not grow to perfection either at Nice or at Grasse. The last-named locality is also deficient in the production of orange-trees:

these are obtained only from Cannes for the manufacture of pomades, and from Nice for distillation.

The flowers employed in the manufacture of perfumery, such as the rose, the jasmine, and the tubereuse, are not so generally cultivated at Grasse as at Cannes.

The annual produce of Grasse and Cannes, and of the adjacent villages, is 40,000 kilogrammes of roses, 50,000 kilogrammes of jasmine, and 10,000 kilogrammes of tubereuses.

Algeria has for some years furnished considerable quantities, probably 6,000 kilogrammes, of essence of geranium. This crop is cultivated over a surface of 400 hectares (about 1,000 acres) in the plain of Metidja, especially at Chesagas and Bouffarick. The climate is such as to admit of three harvests a year instead of one as in France. But the Algerian essence is of inferior value to that of France, the latter being much more delicate, and its odour recalling that of the rose.

Orange-flower Water.—According to the quantity of orange-flowers stated to be produced at Grasse, Cannes, and at Nice, not more than 465,000 litres or kilogrammes of orange-flower water can be either manufactured or distilled in a pure state with the quantity of orange-flowers supplied to the distillers by the manufacturers of pomades; whereas the adulteration of this article is so great, that upwards of 1,000,000 kilogrammes of spurious orange-water is exported. It is, therefore, highly important that the distillation of these flowers should be subject to a strict surveillance.

This abuse may be remedied either by the institution of a commission for that purpose at Cannes, or by the appointment of an inspector, whose office should be to examine the distilled waters at the moment they leave the distiller's, and who should be empowered to punish severely in cases in which leaf-water, or any other fraudulent mixture, may be sold by him under the name of orange-flower water.

For my own part, it would give me great pleasure if the French Government, whose solicitude for all matters concerning the public good is so great, would devote its attention to this important subject.[1]

Grasse and Cannes manufacture annually:—

Kilogrs.	
150,000	of pomades and scented oils.
250	of pure otto of neroli.
450	„ otto of petit grain.
4,000	„ otto of lavender.
1,000	„ Roman essences.
1,000	„ otto of thyme.

The ottos of neroli and of petit grain produced at Cannes are far superior in quality to those produced at Grasse. The reason for this difference is obvious; for as Grasse does not produce the flowers which are most generally used in the manufacture of perfumery, and can obtain them from Cannes only, a long time must necessarily elapse between the time of gathering them, and that of their manufacture, added to which also their conveyance during the heat of summer is at all times detrimental.

[1] NOTE BY THE EDITORS OF THE FRENCH EDITION.—We are glad to see that a respectable English merchant shares on this subject the opinion of his French brethren, who are jealous of their dignity, and practise their profession with equal intelligence and refinement. We know, indeed, that worthy French perfumers and distillers have long ago called for such measures as are spoken of by Dr. Piesse; it is in fact only smugglers and unscrupulous manufacturers who clamour for English freedom of trade.

In our view, nothing ought to be sold under the name of orange-flower water but distilled water made from the flowers; and its quality ought to be indicated by a label bearing the usual denominations,—simple, double, triple, and quadruple. Water made from the leaves should bear the name of *Orange-leaf water*; the *artificial* water—*i.e.* the water prepared from neroli—ought to be rejected and its manufacture prohibited. The mixing of the waters from the flowers and from the leaves ought as strictly to be prohibited, for the most experienced judge may be deceived, and the various chemical tests proposed for the detection of these mixtures are inadequate. For medicinal purposes, the flower-water must be exclusively used, as the leaf-water possesses therapeutical properties of an altogether different kind.

It would be advantageous to the manufacturer, and also to the consumer, if the flowers were consumed in the locality in which they are produced, in order that they may be obtained in as fresh a state as possible. It is for this object that Cannes has witnessed the erection of a large perfumery establishment in the midst of the gardens of M. Louis Herman, which is certainly without an equal in the country, and which, owing to the excellent condition of his productions, has not failed to gain for him much popularity for the excellence and superiority of his produce. This establishment manufactures annually from 38,000 to 40,000 kilogrammes of pomades and scented oils.

To the chemical philosopher, the study of Perfumery opens a book as yet unread; for the practical perfumer, on his laboratory shelves, exhibits many rare essential oils, such as essential oil of the flower of the *Acacia farnesiana*, essential oil of violets, tubereuse, jasmine, and others, the compositions of which have yet to be determined.

To the physicist the study of Perfumery will show him that some hypothesis must yet be founded, on which he can hope to build up the laws by which different odours act upon the human intellect, in unison with its other faculties.

The exquisite pleasure derived from smelling fragrant flowers would almost instinctively induce man to attempt to separate the odoriferous principle from them, so as to have the perfume when the season denies the flowers. Thus we find the alchemists of old torturing the plants in every way their invention could devise for this end; and it is on their experiments that the whole art of Perfumery has been reared.

SECTION IV.

Should we chance to stray
Down by the hamlet's hawthorn-scented way . . .
The sight is pleased,
The scent regal'd ; each odoriferous leaf,
Each opening blossom, freely breathes abroad
Its gratitude, and thanks HIM with its sweets.

WITHOUT recapitulating those facts which may be found diffused through nearly all the old authors on medical botany, chemistry, pharmacy, and works of this character, from the time of Paracelsus to Celnart, we may state at once the mode of operation adopted by the practical perfumer of the present day for preparing the various extracts of essences, waters, oils, pomades, &c., used in his calling.

The processes are divided into four distinct operations, viz. :—

1. EXPRESSION ; 2. DISTILLATION ; 3. MACERATION ; 4. ABSORPTION.

1. *Expression* is only adopted where the plant is very prolific in its volatile or essential oil—*i. e.* its odour ; such, for instance, as is found in the pellicle or outer peel of the orange, lemon, and citron, and a few others. In these cases the parts of the plant containing the odoriferous principle are put, sometimes in a cloth bag, and at others, by themselves, into a press, and by mere mechanical force it is squeezed out. The press is an iron vessel of immense strength, varying in size from six

inches in diameter, and twelve deep, and upwards, to contain one hundred weight or more; it has a small aperture at the bottom to allow the expressed material to run for collection; in the interior is placed a perforated false bottom, and on this the substance to be squeezed is placed, covered with an iron plate fitting the interior; this is connected with a powerful screw, which, being turned, forces the substance so closely together, that the little vessels containing the essential oils are burst, and it thus escapes. The common tincture-press is indeed a model of such an instrument. Another form of press is illustrated at p. 84. The oils which are thus collected are contaminated with watery extract, which exudes at the same time, and from which it has to be separated; this it does by itself to a certain extent, by standing in a quiet place, and it is then poured off, and filtered when requisite.

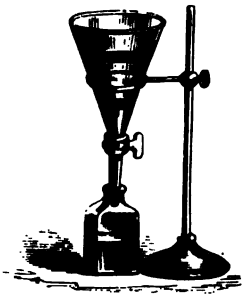


PIPETTE TO DRAW OFF SMALL PORTIONS OF OTTO FROM WATER.

In large establishments the hydraulic press is most frequently used.

2. *Distillation.*—The plant, or that part of it which contains the odoriferous principle, is placed in an iron copper, or glass pan, varying in size from that capable of holding from one to twenty gallons, and covered with water; to the pan a dome-shaped lid is fitted, terminating with a pipe, which is twisted corkscrew fashion, and fixed in a bucket, with the end peeping out like a tap in a barrel. The water in the still—for such is the name of the apparatus—is made to boil; and, having no other exit, the steam must pass through the coiled pipe; which, being surrounded with cold

water in the bucket, condenses the vapour before it can arrive at the tap. With the steam, the volatile oil—*i. e.* perfume—rises, and is liquefied at the same time. The liquids which thus run over, on standing for a time, separate into two portions, and are finally divided with a funnel having a stop-cock in the narrow part. By this process, the majority of the volatile ottos are procured. In some few instances alcohol—*i. e.* rectified spirit of wine—is placed upon the odorous materials in lieu of water, which, on being distilled, comes away with the perfuming substance dissolved in it. But this process is now nearly obsolete, as it is found more beneficial to draw the oil or essence first with water, and afterwards to dissolve it in the spirit. The low temperature at which the spirit boils, compared with water, causes a great loss of otto, the heat not being sufficient to disengage it from the plant, especially where seeds, such as cloves or caraway, are employed. The illustration of the gigantic still (of which there are two under the same roof) at Mitcham, facing the front page of this work, exhibits a practical working apparatus capable of receiving a ton of herbs to distil at one time.

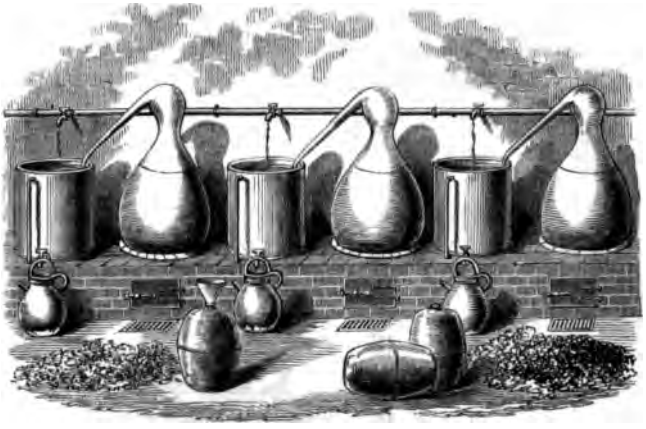


TAP FUNNEL FOR SEPARATING OTTO FROM WATER AND SPIRIT FROM OIL.

The stills employed by M. Louis Herman, of Cannes, Var, France, are much smaller than the Mitcham still; but instead of one there are thirteen, side by side under one roof, as shown in the annexed sketch. The water used to keep the worms cool is supplied by natural springs, which flow to any part of the manufactory, in inexhaustible quantities, from the neighbouring Estrelle mountains. In this respect M. Pilar, of Grasse, is equally fortunate, the cost of such water being

merely a small sum paid to the town every year. The French houses work their stills by the direct action of the fire to the still, which is liable to give an empyreumatic or burnt smell to the distillate; but in all the well-regulated perfumatories of Bond Street, London, the stills are worked by the steam, under ten or fifteen pounds' pressure, from a boiler. This method by steam is now generally adopted in France.

The illustration on p. 76 exhibits the best form and construction of still hitherto invented, the novel parts of which

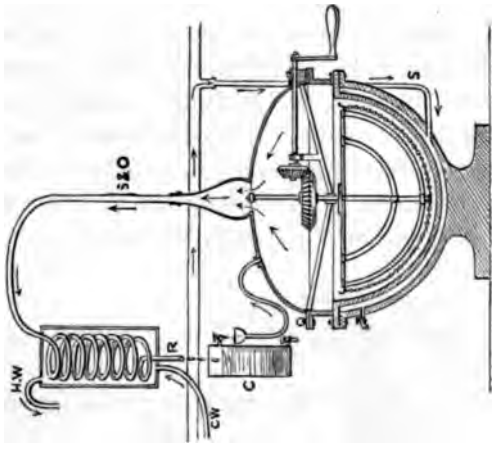


FRENCH STILLS.

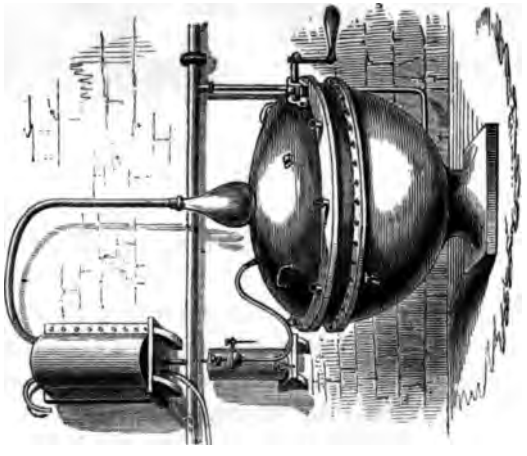
were patented by the firm of Drew, Heywood, and Barron, whose ottos and essential oils are alike known for purity and quality.

The whole apparatus stands upon a massive foot. By examining the sectional drawing it will be seen that the pan is double, a hollow space existing between the inner and outer pan, technically termed the 'steam jacket.'

Steam is supplied from a boiler by the pipe S. The still is separable into two main parts—namely, the head and the



SYPHON STILL AND SECTION.



pan ; when in use they are firmly bolted together with screws, as shown in the drawing. Within the head of the still is fixed the 'rouser,' which is a double cross-bar, curved to fit the pan, to which is attached a chain, to drag over the bottom of the pan. The whole is set in motion by an assistant turning the handle outside in connection by the axle with the cog wheels in the interior of the still.

Supposing the still to be charged, say with two hundredweight of cloves, water is supplied till the pan is nearly full ; the head of the still is then bolted on. Steam being applied in the jacket, the water and cloves in the pan are soon brought to a boiling heat, and then, being well roused together, the otto of cloves is disengaged, and carried forward by the steam generated up the pipe marked S & O, and is quickly condensed in the refrigerator, running out at R, and falling into the cistern C.

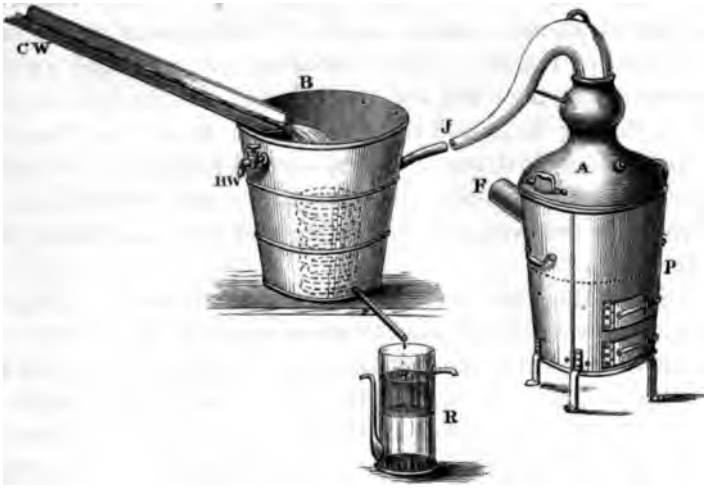
Here the otto and the water spontaneously divide, the otto of cloves falling, and the water rising in the cistern. As soon as the water reaches the overflow-tap, it runs into the syphon funnel, thence into the still. Ingeniously simple as this syphon contrivance is, the whole merit of this form of still turns on the application of the syphon, by means of which the *same water*, which left the still in the form of steam, *returns again and again* into the pan. The pipes C, W convey cold water from an outer tank to the refrigerator, while H, W carry off the hot water produced by the condensations taking place in the worm pipe.

In cases where the otto disengaged from the material yielding it is lighter than water, it is obvious that the lower tap of the cistern must be made to supply the syphon, in place of the upper one.

It is almost needless to say that the syphon must, in the first instance, be filled with water, in order to prevent the escape by that orifice of any fragrant vapour from the still ;

the pressure of vapour within is not then sufficient to overcome the weight of the short column of water in the syphon.

The illustration shows a very useful form of portable still, fit for persons entering upon the business of distilling flowers or herbs in the Colonies. They are made by Messrs. Benham & Froud, of sizes from one to twenty gallons, at an average cost of about 30*s.* per gallon.



PORTABLE STILL AND WORM TUB.

A, Still head.
P, Pan indicated by the dots, into which the material to be distilled and water are placed.
F, Flue pipe.
B, Bucket containing the still worm or condenser, as shown by the dotted screw lines within. This is connected with pipe.
J, Where the junction is made before the steam is got up.
C W, Cold water trough.
H W, Exit for hot water produced by the condensation of steam in the worm.
R, Recipient for the condensed otto and water.

M. Chardin-Hadancourt, having observed that certain essences are more easily obtained by means of a current of vapour than by boiling, has adopted two forms of still, ac-

cording to the bodies whose essences are to be extracted :— 1st, a still of spherical form, into which a jet of vapour is forced at a pressure of 4 to 5 kilogrammes ; 2nd, a still with a double bottom, supporting a pressure of 6 kilogrammes.

He has advantageously substituted for the worm a refrigerator composed of two sheets of tinned copper, 20 millimetres apart, which is placed in a tank of iron plate 20 centimetres thick, filled with cold water. To replace the water condensed in the still he has made use of the principle of impelling liquids by vapour under pressure by means of two opposing cones.

Distillation, considered with regard to the preparation either of essences or of distilled waters, merits the closest attention of distillers. As a general rule it ought to be effected by steam ; but there are cases in which actual contact with water is indispensable (bitter almonds, cherry-bay). In other cases it might be conducted by an open fire or by steam ; but the former method may be preferable (lime-tree, cinnamon).

The selection of waters is of some importance. Those which are perfectly neutral must be chosen, and those which are rich in salts must be avoided. M. Schladenhaufen, however, has shown that in operating on cherry-bay common water has, contrary to all expectation, yielded a product stronger and richer in hydrocyanic acid than distilled water.

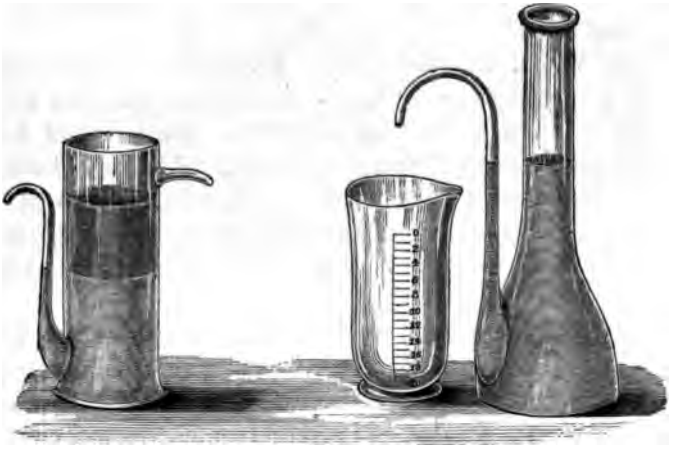
Distilled waters and essences must be kept from contact with air and light in vessels of glass or tinned copper, for these products are liable to be acidified, and then they attack metals.

As receiver of essences, that most commonly used is a vessel of peculiar shape, named the *Florentine recipient.* There are various forms of this vessel ; but all are based upon the same principle, and are designed to effect a separation of two liquids of different densities during the process of distillation.

The form given in the accompanying illustration is that most frequently adopted. When the essence is lighter than water, it escapes by the upper tube; when heavier, by the lower. The surplus water passes away by the opposite tube.

We have to add that, in certain cases (cinnamon, clove, sassafras), sea salt is added to the water for the purpose of raising its boiling-point.

And further, that when the products of distillation are capable of being solidified at a low temperature, the worm



FLORENTINE RECIPIENTS.

must not be allowed to cool, but be kept warm. This precaution is observed for essence of anise. It so happens, however, that the finest odours—the *recherché*, as the Parisians say—cannot be procured by this method; then recourse is had to the next process, *i.e.* maceration.

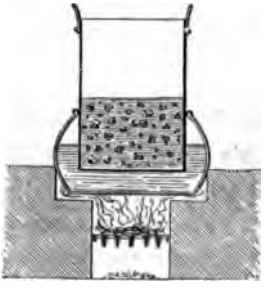
3. *Maceration.*—This operation is conducted thus:—For what is called pomade, a certain quantity of purified beef or deer suet, mixed with purified lard, is put into a clean metal or porcelain pan; this being melted by a steam heat or bath,

the kind of flowers required for the odour wanted are carefully picked and put to the liquid fat, and allowed to remain from



MACERATION PANS, OR BAINS-MARIE, &C.

twelve to forty-eight hours; the fat has a particular affinity or attraction for the otto of flowers, and thus, as it were, draws it out of them, and becomes itself, by their aid, highly perfumed; the fat is strained from the spent flowers, and fresh are added ten or fifteen times over, till the pomade is of the required strength; these various strengths of pomatums are noted by the French makers as Nos. 6, 12, 18, and 24, the higher numerals indicating the amount of fragrance in them. For perfumed oils, the same operation is followed; but, in lieu of suet, fine olive oil; and the same results are obtained. These oils are called 'Huile Antique' of such and such a flower. The maceration



SECTION OF BAIN-MARIE.

pans are here illustrated (p. 81) as used by M. March, of Nice.

The orange, rose, and cassie compounds are principally prepared by this process.

The violet and réséda pomades and oils are prepared first by the maceration process, and then finished by *enfleurage*.

When neither of the three foregoing processes gives satisfactory results, the method of procedure adopted is by,

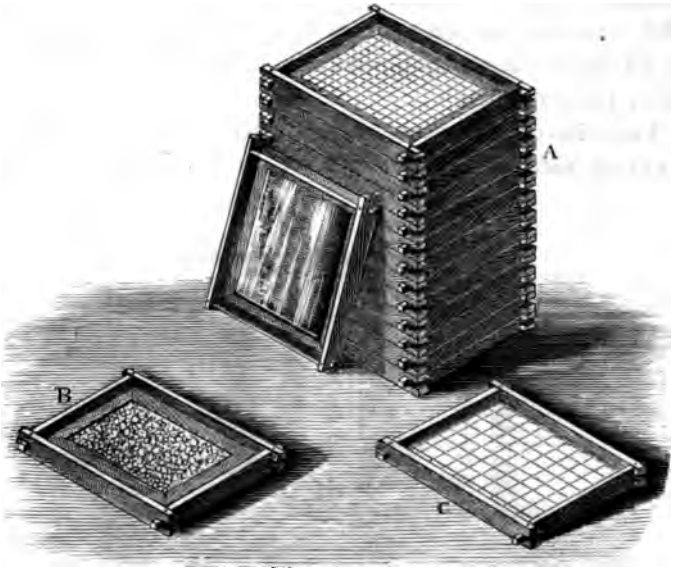
4. *Absorption* or *Enfleurage*.—Of all the processes for procuring the perfumes of flowers, this is the most important



CHÂSSIS EN VERRE.

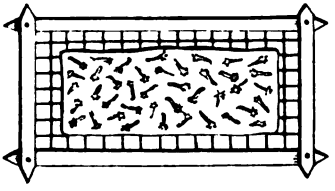
to the perfumer, and is the least understood in England; as this operation yields not only the most exquisite essence indirectly, but also nearly all those fine pomades known here as 'French pomatums,' so much admired for the strength of fragrance, together with 'French oils,' equally perfumed. The odours of some flowers are so delicate and volatile, that the heat required in the previously named processes would greatly modify, if not entirely spoil, them; this process is, therefore, conducted cold, thus:—Square frames, called *châssis*, about

three inches deep, with a glass bottom, say two feet wide and three feet long, are procured; over the glass a layer of fat is



A represents a pile of glass sashes.
B represents a sash with lard and flowers upon it.
C represents a wire sash for the enfleurage of oil upon a cotton fabric.

spread, about a quarter of an inch thick, with a kind of plaster knife or spatula; on this the flower buds are sprinkled, com-



CHÂSSIS EN FER.

pletely over it, and there left from twelve to seventy-two hours.

Some houses, such as that of Messrs. Pilar and Sons, Pascal Brothers, L. Herman, and a few others, have 3,000 such frames at work during the season ; as they are filled, they are piled one over the other, the flowers are changed so long as the plants continue to bloom, which now and then exceeds two or three months.

For oils of the same plants, coarse cotton cloths are saturated with the finest olive oil, and laid upon a frame



SCREW PRESS.

containing wire gauze in lieu of glass ; on these the flowers are laid, and suffered to remain till fresh flowers are procured.

This operation is repeated several times, after which the cloths are subjected to a great pressure, to remove the now perfumed oil.

In all the processes of enfleurage or maceration, greasy substances are to this day employed, such as olive oil and

the fats consisting of a mixture of lard and suet, both highly purified.

MM. Chardin and Manignon assert that they can use the solid paraffin of commerce as a vehicle in place of fats or oils for the maceration and enfleurage process, and claim superiority, inasmuch that paraffin never becomes rancid; this last remark is certainly true, but the author doubts the position advanced, because it is known that paraffin is a non-absorbent of odour. Their best test, however, is to send their products into the market.

As we cannot give any general rule for working, without misleading the reader, we prefer explaining the process required for each when we come to speak of the individual flower or plant.



SMELLING, FROM THE DRESDEN GALLERY.

SECTION V.

Me seem'd I smelt a garden of sweet flow'rs,
That dainty odours from them threw around
For damsels fit to deck their lovers' bow'rs.—SPENSER.

THE perfumes for the handkerchief, as found in the shops of Paris and London, are either simple or compound: the former are called extracts, *extraits*, *esprits*, or essences; and the latter, *bouquets* or nosegays, which are mixtures of the extracts so compounded in quantity that no one flower or odour can be discovered as predominating over another; and when made of the delicate-scented flowers carefully blended, they produce an exquisite sensation on the olfactory nerve, and are therefore much prized by all who can afford to purchase them.

We shall first explain the mode for obtaining the simple extracts of flowers. This will be followed by the process for preparing ambergris, musk, and civet substances, which, though of animal origin, are of the utmost importance as forming a large part in the most approved bouquets; and we shall conclude this department of the art with recipes for all the fashionable bouquets and nosegays, the value of which, we doubt not, will be estimated according to the labour bestowed upon their analysis.

In order to render the work more easy of consultation, we have adopted the alphabetical arrangement in preference to a more scientific classification.

Among the collection of ottos of the East India

Company, at the Exhibition of 1851, were several hitherto unknown in this country, and possessing much interest.

It is to be regretted that no person, having any *practical* knowledge of perfumery, was placed on the jury of Class IV. or XXIX. Had such been the case, the desires of the exhibitors would probably have been realised, and European perfumers benefited by the introduction of new odours from the East. Some of the ottos sent by a native perfumer of Benares were deemed worthy of honourable mention—such as *Chumeylee, Beyba, Begla, Motcya,* and many others from the Moluccas, but without any information respecting them.

We are not going to speak of, perhaps, more than a tithe of the plants that have a perfume—only those will be mentioned that are used by the operative perfumer, and such as are imitated by him in consequence of there being a demand for the article, which circumstances prevent him from obtaining in its genuine state. The first that comes under our notice is

ALLSPICE.—The odoriferous principle of allspice, commonly called pimento, is obtained by distilling the dried fruit, before it is quite ripe, of the *Eugenia pimenta* and *Myrtus pimenta* with water. It is thus procured as an essential oil; it is but little used in perfumery, and when so, only in combination with other spice oils for scenting soap; it is, however, very agreeable, and much resembles the smell of cloves, and deserves more attention than it has hitherto received. Mixed in the proportion of three ounces of oil of allspice with one gallon of rectified spirit of wine, it forms what may be termed extract of allspice, which extract will be found very useful in the manufacture of low-priced bouquets. (See PIMENTO.)

ALMONDS.

> Mark well the flow'ring almond in the wood;
> If od'rous blooms the bearing branches load,

The glebe will answer to the sylvan reign,
Great heats will follow, and large crops of grain.—VIRGIL.

This perfume has been much esteemed for many ages. It may be procured by distilling the leaves of any of the laurel tribe, and the kernels of stone fruit; for trade purposes, it is obtained from the bitter almond, and exists in the skin or pellicle that covers the seed after it is shelled. In the ordinary way, the almonds are put into the press for the purpose of obtaining the mild or fat oil from the nut; the



ALMOND.

cake which is left after this process is then mixed with salt and water, and allowed to remain together for about twenty-four hours prior to distillation. The reason for moistening the cake is well understood by the practical chemist; and although we are not treating the subject of perfumery in a chemical sense, but only in a practical way, it may not be inappropriate here to observe, that the essential oil of almonds does not exist ready formed to any extent in the nut, but that it is produced by a species of fermentation, from the amygdalin and emulsine contained in the almonds, together with the water that is added. Analogous substances exist in laurel leaves, and hence the same course is to be pursued when they are distilled. Some manufacturers put the moistened

cake into a bag of coarse cloth, or spread it upon a sieve, and then force the steam through it; in either case, the essential oil of the almond rises with the watery vapour, and is condensed in the still-worm. Fourteen pounds of the cake yield about one ounce of essential oil. In this concentrated form, the odour of almonds is far from agreeable; but when diluted with spirit, in the proportion of about one and a half ounce of the oil to a gallon of spirit or alcohol, it is very pleasant.

The essential oil of almonds enters into combination with soap, cold cream, and many other materials prepared by the perfumer; for which see their respective titles.

In experiments with this substance it must be carefully remembered that it is exceedingly *poisonous*, and, therefore, great caution is necessary in its admixture with substances used as cosmetics, otherwise dangerous results may ensue.

The essence of bitter almonds, being heavier than water, falls to the bottom of the receiver; and thus obtained, *i. e.* in the raw state in which it is used in perfumery, it contains variable proportions of hydrocyanic (prussic) acid, and is a virulent poison. When purified it is still poisonous, though much less so. Its purification is effected first by washing in distilled water, and afterwards by distillation in contact with potash and perchloride of iron. The pure essence may be represented by the symbols $C^{14}H^{6}O^{2}$. By contact with the air, it is transformed into benzoic acid, according to the following equation :—

$$\underset{\text{Essence of bitter almonds}}{C^{14}H^{6}O^{2}} + O^{2} = \underset{\text{Benzoic acid.}}{C^{14}H^{5}O^{3}HO}$$

The essence of bitter almonds, when treated with an alcoholic solution of potash, is converted into benzoate of potash; while the same solution changes the essence of

miribane or nitrobenzine into a resin insoluble in alcohol or in ether. This process is available as a test for the mixture of these two essences.

Artificial Otto of Almonds, otherwise *Miribane*.—Mr. Mansfield, of Weybridge, took out a patent for the manufacture of otto of almonds from benzole. (Benzole is obtained from tar oil.) His apparatus, according to the Report of the juries of the 1851 Exhibition, consists of a large glass tube in the form of a coil, which at the upper end divides into two tubes, each of which is provided with a funnel. A stream of nitric acid flows slowly into one of the funnels, and benzole into the other. The two substances meet at the point of union of the tubes, and a combination ensues with the evolution of heat. As the newly formed compound flows down through the coil, it becomes cool, and is collected at the lower extremity; it then requires to be washed with water, and lastly with a dilute solution of carbonate of soda, to render it fit for use. Nitrobenzole, which is the chemical name for this artificial otto of almonds, has a different odour to the true otto of almonds, but it can nevertheless be used for perfuming soap. The late Mr. Mansfield wrote to me under date January 3rd, 1855: 'In 1851, Messrs. Gosnell, of Three King Court, began to make this perfume under my licence; latterly I withdrew the licence from them by their consent, and since then it is not made that I am aware of.' Notwithstanding this remark of Mr. Mansfield, there is plenty of Miribane in the London market, and it is quite common in Paris.[1]

ANISE.—The odorous principle is procured by distilling the seeds of the plant *Pimpinella anisum*; the product is the oil of aniseed of commerce. As it congeals at a temperature

[1] Nitrobenzine has been made for commercial purposes by M. Laroque, at Paris, and more recently by M. Collas. It is now used in the preparation of *aniline*, and the beautiful colours made from it.

of about 50° Fahr., it is frequently adulterated with a little spermaceti, to give a certain solidity to it, whereby other cheaper essential oils can be added to it with less chance of detection. As the oil of aniseed is quite soluble in spirit, and the spermaceti insoluble, the fraud is easily detected.

This perfume is exceedingly strong, and is, therefore, well



ANISE.

adapted for mixing with soap and for scenting pomatums. but does not do nicely in compounds for handkerchief use The Portuguese are very fond of anise.

Several kinds of anise are known in the trade—those of Tours, of Alby, or the South of France, Russian, German, Maltese, and Spanish (Alicante). The last is the most

esteemed. The adulteration of oil of aniseed with soap has been noticed. This fraud may be detected by means of distilled water, which dissolves the soap but not the essence.

STARRY ANISE, or BADIANI.—This is the name given to the fruit of an evergreen shrub found in Florida. Two species are known, the *Illicium floribundum* and the *Illicium parviflorum*. But the one chiefly used is the Chinese *Illicium*



STARRY ANISE, OR BADIANI.

anisatum. The fruit is formed by the union of from 6 to 12 capsules arranged like a star. The fruit is hard, thick, woody, brownish, and contains an oval seed, reddish, glossy, and brittle, within which is a white oily almond.

By distillation of this fruit with water an essence is obtained of the same composition and possessing all the properties of the essence of green anise; *i. e.* it is composed of two essences, the one being a hydrocarbonate and liquid, the

other a solid and oxygenised. These are separated by alcohol. The essence of badiani is more agreeable than that of anise.

The wood of the *Illicium anisatum* has the same odour as the fruit. It was at one time thought that it furnished the anise-wood of commerce; but this comes from America, and is probably produced by the *Ocotea pechurini.*

BALM, otto of Balm, called also oil of Melissa, is obtained by distilling the leaves of the *Melissa officinalis* with water; it comes from the still tap with the condensed steam or water, from which it is separated in the usual way.

The sweet lemon-like odour of its leaves must render this a general favourite. The scent is most powerful in early summer, just before the blossom appears, when after a sprinkling of rain it perfumes the whole border. You constantly meet with it growing wild in the south of France, but in England we cultivate it. It is a perennial, and blossoms in June.

The otto of melissa or balm enters into the composition of the celebrated Carmelite Spirit. It is said that during the cloister life of Charles V. in the monastery of St. Yuste, that he daily used it at the bath and upon his handkerchiefs, to refresh that once vigorous intellect in its decline. The following is the formula for

Eau des Carmes.

Take fresh balm leaves two pounds; of fresh lemon peel a quarter of a pound; of nutmeg, coriander seed, cloves, cinnamon, and angelica root, each two ounces, all broken fine: place all these into a still with half a gallon of orange-flower water and one gallon of alcohol 60 over proof; distil slowly until one gallon comes over, which is the Eau des Carmes.

BALSAM.—Under this title[1] there are three substances

[1] The definition of Balsam now adopted in France is the following:—Every resinous substance incapable of saponification, rough to the touch, insoluble in

used in perfumery ; these are : balsam of Peru, balsam of tolu, and balsam of storax. The first-named is procured from the *Myroxylon peruiferum*; it exudes from the tree when wounded, and is also obtained by boiling down the bark and branches in water. The latter is the most common method of procuring it. It has a strong odour, like benzoin and vanilla mixed. (See PERU.)

Tolu.—Balsam of tolu flows from the *Toluifera balsamum*. It resembles common resin (rosin) ; with the least warmth, however, it runs to a liquid, like brown treacle. The smell of it is particularly agreeable, and, being soluble in alcohol, makes a good basis for a bouquet, giving in this respect a permanence of odour to a perfume which the simple solution of an oil would not possess. For this purpose all these balsams are very useful, though not so much used as they might be. The proportions are :—Balsam of tolu, ½ lb. ; spirit, 60 o. p., 1 gallon. (See STORAX and TOLU.)

Ulex has found that balsam of tolu is frequently adulterated with common resin. To detect this adulteration he pours sulphuric acid on the balsam, and heats the mixture, when the balsam dissolves to a cherry-red fluid, without evolving sulphurous acid, but with the escape of benzoic or cinnamic acid, if no common resin is present. On the contrary, the balsam foams, blackens, and much sulphurous acid is set free, if it is adulterated with common resin.—*Arch. der Pharmacie.*

In commerce we distinguish the dry and the soft balsam of tolu. When distilled with water they both yield a liquid compound of three volatile bodies: 1. *Toluene*, a liquid essence which boils at 120°, formed of $C^{21}H^{18}$; 2. *Benzoic Acid*; 3. *Cinnameine*, which boils at 340° ; it contains benzoic and cinnamic acids.

The presence of colophany, turpentine, or other resins in tolu is shown by the resinous odour given out on burning it.

water, soluble in alcohol, ether and the oils, and containing benzoic or cinnamic acid, or both together.

Peru.—We notice also the ***dry balsam of Peru***, no longer an article of commerce, the ***brown balsam of Peru***, the ***balsam of San-Salvador*** or ***black balsam of Peru***, and the ***liquid balsam of Peru*** of commerce. All these are composed of a resin, a liquid oil (*cinnameine*) and cinnamic acid. The liquid balsam of Peru is adulterated with castor oil. The adulteration is discovered by the resinous odour disengaged when the balsam is placed over burning charcoal. Ulex recommends that the balsam should be heated in an oil-bath at 190°, until the balsam gives out a few drops of a very acid oleaginous liquid, which causes a deposit of crystals of cinnamic acid. In case the balsam is pure, the liquid solidifies entirely; if it be not pure, the crystals will float in essence of copaiva. Alcohol is detected by agitation with water which dissolves the alcohol; and the presence of thick oils by alcohol which will dissolve the balsam, but not the oils.

Storax.—Balsam of storax, commonly called gum styrax, is obtained in the same manner, and possessing similar properties, with a slight variation of odour, is applicable in the same manner as the above.

They are all imported from South America, Chili, and Mexico, where the trees that produce them are indigenous.

Mecca.—The genuine balsam of Mecca (*Gum of Amyris opobalsamum*) is both scarce and expensive. The kings of Judah cultivated this shrub, but only to a very small extent. It will be interesting to learn, that a bottle of this extraordinary balsam is kept at the botanical garden at Paris, as an object of the rarest and highest value. What is generally sold by the name of balsam of Mecca is merely the oil, obtained by boiling, from the seeds, stones, and the branches of the tree. It is too rare to be purchased at any price, as it is generally supposed to be. Josephus informs us that the Queen of Sheba brought it first to Judea, where balsam, myrrh, and incense, in the days of old, were to be seen used

by the populace in abundance, almost daily. This is one of the many things which we 'mourn for' in the 'days gone by.' The reason of its excessive scarcity is supposed to be owing to the destruction of Jerusalem: the Jews, actuated by despair and hatred, destroyed all the balsam plants. There are none now to be found in Palestine. Only one plantation is now known to furnish it, and that is in Arabia Petrea. The whole plantation only yields about three pounds annually, and it is monopolised by the Grand Seigneur. This, of course, we can scarcely refrain from noticing without an expression of regret.

BAY.—Oil of sweet Bay, also termed essential oil of laurel-berries, is a very fragrant substance, procured by distillation from the berries of the bay laurel (*Laurus nobilis*). Though very pleasant, it is not much used.

Another essence of bay familiar in commerce is extracted from various *ocotea* of the family of the Lauraceæ. It is fluid, colourless, and has a pleasant smell. Its density is of 0.864 at 13°. Its formula is $C^{20}H^{16}$. It forms with water a hydrate $=C^{20}H^{16}6HO$ (Stenhouse).

BASIL.—Under the name of HOLY BASIL I have made a perfume which appears, by its extensive sale, to give much satisfaction. As many of the scents which I have concocted have proved great successes, I can here afford to say that others have been dead failures! Dr. George Birdwood writes:—

The most sacred plant in the whole indigenous materia medica of India is the Tulsi or Holy Basil (Ocymum sanctum), sacred to Krishna, and called after the nymph Tulasi, beloved of Krishna, and turned by him into this graceful and most fragrant plant. She is indeed the Hindu Daphne. The plant is also sacred to Vishnu, whose followers wear necklaces and carry rosaries (used for counting the number of recitations of their deity's name), made of its stalks and roots. For its double sanctity it is reared in every Hindu house, where it is daily watered and worshipped by all the members of the household. No doubt also it was on account of its virtues in disinfecting and vivifying malarious air that it

first became inseparable from Hindu houses in India as the protecting spirit or Lar of the family. In the Deccan villages, the fair Brahminee mother may be seen early every morning, after having first ground the corn for the day's bread, and performed her simple toilet, walking with glad steps and waving hands round and round the pot of Holy Basil, planted on the four-horned altar built up before each house, invoking the blessings of heaven on her husband and his children—praying, that is, for less carbonic acid and ever more and more oxygen. The scene always carries one back in mind to the life of ancient Greece, which so often is found still to live in India.

The following is the composition of the perfume :—

Holy Basil.

	Pints.
Extract of Tonquin Bean	2
„ Vanilla	2
Essence of Geranium	2
„ Montserrat Lime . . .	1
„ Tolu	1
„ Orange Flower	1
„ Cassie	1
„ Jasmine	1
„ Tuberose	1
	12

BENZOIN, also called BENJAMIN.—This is a very useful substance to perfumers. It exudes from the *Styrax Benzoin* by wounding the tree, and, drying, becomes a hard gum resin. It is principally imported from Borneo, Java, Sumatra, and Siam. The best kind comes from the latter place, and used to be called Amygdaloides, because of its being interspersed with several white spots, which resemble broken almonds. When heated, these white specks rise as a smoke, which is easily condensed upon paper. The material thus separated from the benzoin is called flowers of benzoin in commerce, and by chemists is termed benzoic acid. It has nearly all the odour of the resin from which it is derived ; but which is due to a minute portion of a peculiar otto that rises in vapour with the acid. This otto of benzoin has not

yet been isolated. When benzoic acid is prepared by the humid process, as is done in the chemical laboratory, it has *no odour*. It may be, however, that the benzoic acid undergoes decomposition when prepared from the gum resin by sublimation, and thus produces the fragrant body which is wanting in that made in the wet way. This is probable, for gum benzoin has but little odour or less than that the acid sublimated from it.

Mr. W. Bastick recommends the following process for making flowers of benzoin :—Coarsely powdered gum benzoin



STYRAX BENZOIN.

is to be strewed on the flat bottom of a round iron pot which has a diameter of nine inches, and a height of about two inches. On the surface of the pot is spread a piece of filtering paper, which is fastened to its rim by starch paste. A cylinder of very thick paper is attached by means of a string to the top of the iron pot. Heat is then applied by placing the pot on a plate covered with sand, over the mouth of a furnace. It must remain exposed to a gentle fire from four to six hours. About an ounce and a half of benzoic acid is obtained from twelve ounces of gum benzoin by the first sublimation. As the gum is not exhausted by the first operation, it may be bruised when cold and again submitted

to the action of heat, when a fresh portion of benzoic acid will sublime from it. This acid thus obtained is not perfectly pure and white; and Dr. Mohr states that it is a question, in a medicinal and perfumery point of view, whether it is so valuable when perfectly pure as when it contains a small portion of a fragrant volatile oil, which rises with it from the gum in the process of sublimation.

The London Pharmacopœia directs that it shall be prepared by sublimation, and does not prescribe that it shall be free from this oil, to which it principally owes its agreeable odour.

By the second sublimation the whole of the benzoic acid is not volatilised. What remains in the resin may be separated by boiling it with caustic lime, and precipitating the acid from the resulting benzoate of lime with hydrochloric acid. Benzoic acid can be obtained also in the wet way, and the resin yields a greater product in this process than in the former; yet it has a less perfumery value, because it is free from the volatile oil which, as above stated, gives it its peculiar odour. The wet method devised by Scheele is as follows:—Make one ounce of freshly-burnt lime into a milk with from four to six ounces of hot water. To the milk of lime, four ounces of powdered benzoin and thirty ounces of water are to be added, and the mixture boiled for half an hour, and stirred during this operation, and afterwards strained through linen. The residue must be a second time boiled with twenty ounces of water and strained, and a third time with ten ounces: the fluid products must be mixed and evaporated to one-fourth of their volume, and sufficient hydrochloric acid added to render them slightly acid. When quite cold, the crystals are to be separated from the fluid by means of a strainer, upon which they are to be washed with cold water, and pressed, and then dissolved in hot distilled water, from which the crystals separate on

cooling. When hydrochloric acid is added to a cold concentrated solution of the salts of benzoic acid, it is precipitated as a white powder. If the solution of the salts of this acid is too dilute and warm, none or only a portion of the benzoic acid will be separated. However, the weaker the solution is, and the more slowly it is cooled, the larger will be the crystals of this acid. In the preparation of this acid in the wet way, lime is to be preferred to every other base, because it forms insoluble combinations with the resinous constituents of the benzoin, and because it prevents the gum resin from conglomerating into an adhesive mass, and also because an excess of this base is but slightly soluble.

The best benzoin is obtained in Siam by incisions made in the trunk of the tree, after it has attained the age of five or six years. The resin is white and transparent at first. About three pounds are given by each tree for about six years. It forms an article of export from Siam. From Singapore, the exports in 1852 were to the extent of 1,282 piculs, and 168 piculs in 1853. Java imported last year benjamin of the value of 176,182 florins. The different varieties bear a price proportioned to their goodness; the finest quality used to range from 10*l.* to 20*l.* per picul of 133 lbs. Benzoin is the frankincense of the far East, and has long been used for incense in the Roman Catholic, the Hindu, Mahometan, and Buddhistic temples, and probably in the Israelitish worship. Wealthy Chinese fumigate their houses with its grateful odour.—P. L. Simonds, Esq. (*read before the Society of Arts*).

The extract, or tincture, of benzoin forms a good basis for a bouquet. Like balsam of tolu, it gives permanence and body to a perfume made with an essential oil in spirit.

The principal consumption of benzoin is in the manufacture of pastilles (see PASTILLES), and for the preparation of fictitious vanilla pomade. (See POMATUMS.)

BERGAMOT.—This most useful perfume is procured from the *Citrus Bergamia*, by expression from the peel of the fruit. One hundred fruit will yield about three ounces of the otto. It has a soft sweet odour, too well known to need description here. When new and good, it has a greenish

yellow tint, but loses its greenness by age, especially if kept in imperfectly corked bottles. It then becomes cloudy from the deposit of resinous matter, produced by the contact of the air, and acquires a turpentine smell.

This perfume is so much in demand that its annual production in Italy has never satisfied the market. The Messina



BERGAMOT.

dealers and their allies carefully adulterate the true Bergamot otto with lemon otto, thus spoiling an article worth from 30*s*. to 40*s*. per pound, in order to sell it at 10*s*. The name of this variety of Citronwort is derived from the city of Bergamo in Lombardy, from whence, so far as we can ascertain, the otto was first sold. The otto of bergamot of the finest quality is obtained by means of the Ecuelle ; but about four fifths of it in the market is a distilled product, or one expressed from the rasped rind of the fruit. About 40,000 pounds of otto are annually imported into England.

It is best preserved in well-stoppered bottles, kept in a cool cellar, and in the dark; light, especially the direct sunshine, quickly deteriorates its odour. This observation may be applied, indeed, to all perfumes, except rose, which is not so spoiled, and clove, which improves by keeping.

When bergamot is mixed with other essential oils, it greatly adds to their richness, and gives a sweetness to spice oils attainable by no other means, and such compounds are much used in the most highly-scented soaps. Mixed with rectified spirit in the proportions of about eight ounces of bergamot to a gallon, it forms what is called 'extract of bergamot,' and in this state is used for the handkerchief. Though well covered with extract of orris and other matters, it is the leading ingredient in Bayley and Blew's Ess. Bouquets. (See BOUQUETS.)

BORAGE.

> *Silenus.* Papaiapaex! what a sweet smell it has!
> *Ulysses.* You see it, then?
> *Silenus.* By Jove, no! but I smell it.
> *Euripides*, SHELLEY'S transl.

It is very probable that the delightful fragrance exhaled by the fresh cool green leaves, and the deep cerulean blue of the flowers themselves, first drew our forefathers' attention to the plant. The mere delightful fresh perfume of the leaves has something reviving and exhilarating about it. The plants of this family perhaps owe some part of their popularity to their provincial name *forget-me-not*; hence any perfume of this title should contain otto of borage.

BRIAR (SWEET-).—(See EGLANTINE.)

CAMPHOR.—This beautiful and fragrant substance is produced by several plants, particularly *Dryobalanops Camphora*, the Camphor tree of Sumatra and Japan. The kind, however, mostly found in commerce is derived from the *Laurus Camphora*, or camphor laurel of the island of Formosa,

carried thence to Canton, from which port the markets of the world are supplied. The camphor exists naturally within the tree ready formed: on splitting the wood, it is found in masses twelve to eighteen inches long, between the bark and the stem, and in the pith. There is a race of men called Nyr-Cappoors, or camphor-seers, who pretend to have the power of distinguishing the most profitable trees to fall. Many trees are, however, cut down at their instigation, without having any cryptæ of camphor in them. Every part



CAMPHOR TREE.

of the *Laurus Camphora* contains camphor, which is extracted by chopping the branches and boiling them in water. The camphor rises to the surface, and becomes solid as the water cools: in some instances, the boiler in which the operation is conducted is covered with an earthen dome lined with rice-straw; as the water boils, the camphor rises with the steam, and attaches itself to the straw, from which it is afterwards picked, and then packed for exportation.

The camphor as found in the shops in England is 'refined,' and is not in the original condition in which it is brought to Europe. The purification or refining of camphor was at one time held as a monopoly at Venice, but is now done in all the large cities of Europe. The process is simple, and consists of mixing the imported camphor with a little lime, and subjecting it to a heat sufficient to convert it to vapour, which readily condenses into the form of the receiver.



BRANCH OF CAMPHOR TREE.

The odour of camphor is very characteristic, and to the majority of people very agreeable. It has the reputation of being highly prophylactic, and to this end is worn about the person in time of sickness; from its reputed antiseptic qualities, it is extensively used in the manufacture of dentifrices, soap, aromatic vinegars, and other toilet appendages.

The camphor of Japan, or of the *Laurus Camphora*, and that of Borneo, derived from the *Dryobalanops Camphora*,

although resembling each other in look and smell, are not of the same composition. The former is represented by $C^{20}H^{16}O^2$, the latter by $C^{20}H^{15}O^2$. With respect to the so-called artificial camphors which are obtained by the action of chlorine or hydrochloric acid upon certain liquid carbonated hydrogens, such as the essences of lemon or turpentine, are not at all analogous in properties or in composition with the true camphors, but merely resemble them somewhat in appearance. The true camphor has been found in other plants of the families of the *lauraceæ*, the *amomées*, *synantheræ*, and certain *labiatæ* of warm countries; but no supply for commerce is to be obtained from any of these.

CARAWAY.—This odoriferous principle is drawn by distillation from the seeds of the *Carum Carui*. It has a very pleasant smell, quite familiar enough without description. It is well adapted to perfume soap, for which it is much used in England, though rarely if ever on the Continent; when dissolved in spirit it may be used in combination with oil of lavender and bergamot for the manufacture of cheap essences, in a similar way to cloves. (See CLOVES.) If caraway seeds are ground, they are well adapted for mixing to form sachet powder. (See SACHETS.)

The seeds of other *umbelliferæ*, such as those of *cumin*, *fennel*, *dill*, yield on distillation essences similar to that of caraway. This consists of two essences, *carvene*$=C^{10}H^8$, and *carvol*$=C^{20}H^{14}O^2$. The essences of other seeds of the same family are of analogous composition.

CASCARILLA.—The bark is used in the formation of Frangipanni incense, and also enters into the composition known as *Eau à Brûler*, for perfuming apartments, to which we refer.

The bark alone of this plant is used by the manufacturing perfumer. The *Cascarilla gratissima* is, however, so fragrant that, according to Burnett, its leaves are gathered by

the Koras of the Cape of Good Hope as a perfume. It behoves perfumers, therefore, who are on the look-out for novelties, to obtain these leaves and ascertain the result of their distillation.

Messrs. Herring & Co., some years ago, drew the oil of cascarilla, but it was only offered to the trade as a curiosity.

The cascarilla (meaning, 'little bark,' in Spanish) of commerce is derived, according to Sir W. Hooker, from the *Croton fragrans*, a native plant of South America.

CASSIA.—The essential oil of cassia is procured by distilling the outer bark of the *Laurus Cassia*. One cwt. of bark yields rather more than three quarters of a pound of oil; it has a pale yellow colour; in smell it much resembles cinnamon, although very inferior to it. It is principally used for perfuming soap, especially what is called 'military soap,' as it is more aromatic or spicy than flowery in odour; it therefore finds no place for handkerchief use.

The *Laurus Cassia*, of the family of the *Lauraceæ*, yields the cinnamon of China, or common cinnamon. The essence extracted from it bears the name of *essence of cassia*. It is of a reddish yellow colour, and has not a pleasant smell.

The cinnamon of Ceylon, *Laurus Cinnamomum*, or *C. zeylandicum*, yields an essence less abundant than the preceding, but more highly valued. It is of a bright yellow colour, has a pleasant smell, and a sweetish aromatic taste. It is sold at from 15 to 20 fr. per 30 grammes, while the first-named is worth only 40 fr. per 1,000 grammes.

CASSIE (*Acacia farnesiana*).

> The short narcissus and fair daffodil,
> Pansies to please the sight, and *cassie* sweet to smell.
> DRYDEN'S *Virgil.*

The young cassie plants are raised from seed, which is sown in beds. The best plants are left, the doubtful ones

removed. In the third year they have generally a height of two or three feet, and are then planted out in fields, each tree requiring about twelve feet square. Before planting the cassie, the ground should be well dressed with manure, and dug to the depth of four or six feet, and in such situations as are well exposed to the sun. This plant thrives better at Cannes than in any other part of Europe. The blossoms of



ACACIA FARNESIANA (FLOWER HEADS, NATURAL SIZE).

the cassie are successive, some being ready for plucking, while the others are scarcely formed. This is immensely useful to the farmer, one lot of blossoms being gathered and passed through the laboratory before it is time to gather the others. After the third year the tree produces flowers, growing at the same time till they attain maturity, when they reach a height of ten or twelve feet, with branches six feet

long, and a stem as thick as a man's wrist. Each full-grown tree will produce about two pounds' weight of flowers, value from three to fourpence per pound, say 30*l.* to 40*l.* per acre.

The illustration of cassie here given more impressively shows what we mean by 'successive' flowering. Flowers, however fragrant, are not of much practical use in the perfumer's laboratory unless they grow 'successive,' because if the flowers come all together there is not sufficient time for the grease to be inflowered. It is found that better results are obtained by *repeating* a small quantity of flowers over grease, rather than inflowering a large quantity of blossoms at one time.

This is one of those fine odours which enter into the composition of the best handkerchief bouquets. When smelled at alone, it has an intense violet odour, and is rather sickly sweet.

It is procured by maceration of the flower heads. Purified fat is melted in the bain-Marie, into which the flower heads are thrown, and left to digest for several hours; the spent flowers are then removed, and fresh are added, eight or ten times, until sufficient richness of perfume is obtained. As many flowers are used as the fluid grease will cover, when they are put into it. The value of cassie buds is from five francs to eight francs the kilogramme, and it requires two kilogrammes of flowers to perfume one kilogramme of grease.

After being strained, and the pomade has been kept at a heat sufficient only to retain its liquidity, all impurities will subside by standing for a few days. Finally cooled, it is the cassie pomade of commerce. The *Huile de Cassie*, or fat-oil of cassie, is prepared in a similar manner, substituting olive oil or almond oil in place of suet. Both these preparations are obviously only a solution of the true essential oil of cassie flowers in the neutral fatty body. Europe may shortly be

expected to import a similar scented pomade from South Australia, derived from the wattle, a plant that belongs to the same genus as the *A. farnesiana*, and which grows most luxuriantly in Australia. Mutton fat being cheap, and the wattle plentiful, a profitable trade may be anticipated in curing the flowers, &c.

To prepare the *extract of cassie*, take six pounds of No. 24 (best quality) cassie pomade, and place upon it one gallon of the best rectified spirit, as sent out by Bowerbank, of Bishopsgate. After it has digested for three weeks or a month, at a summer heat, it is fit to draw from the pomatum, and, if good, has a beautiful olivaceous green colour and rich flowery smell of the cassie blossom. All extracts made by this process give a more natural smell of the flowers to the result, than by merely dissolving the essential oil (procured by distillation) in the spirit; moreover, where the odour of the flower exists in only very minute quantities, as in the present instance, and with violet, jasmine, &c., it is the only practical mode of proceeding.

In this and all other similar cases, the pomatum must be cut up into very small pieces, after the domestic manner of 'chopping suet,' prior to its being infused in the alcohol. The action of the mixture is simply a change of place in the odoriferous matter, which leaves the fat body by the superior attraction, or affinity, as the chemists say, of the spirits of wine, in which it freely dissolves.

The major part of the extract can be poured or drawn off the pomatum without trouble; but it still retains a portion in the interstices, which requires time to drain away, and this must be assisted by placing the pomatum in a large funnel, supported by a bottle, in order to collect the remainder. Finally, all the pomatum, which is now called *washed pomatum*, is to be put into a tin or copper can, which can must be set in hot water, for the purpose of melting its contents; when

the pomatum thus becomes liquefied, any extract that is still in it rises to the surface, and may be skimmed off; or, when the pomatum becomes cold, it can be poured from it. Any alcohol still remaining in it may be recovered by placing the pomatum in a still and distilling it. There may be a slight loss of perfume, but the alcohol is recovered.

The washed pomatum is preserved for use in the manufacture of dressing for the hair, for which purpose it is exceedingly well adapted, on account of the purity of the grease from which it was originally prepared, but more particularly on account of a certain portion of odour which it still retains; and were it not used up in this way, it would be advisable to put it for a second infusion in spirit, and thus a weaker extract could be made serviceable for lower priced articles. The pomatum thus drained can still be used in the manufacture of coloured soaps.

I cannot leave cassie without recommending it more especially to the notice of perfumers and druggists, as an article well adapted for the purpose of the manufacture of essences for the handkerchief and pomades for the hair. When diluted with other odours, it imparts to the whole such a true flowery fragrance, that it is the admiration of all who smell it, and has not a little contributed to the great sale which certain proprietary articles have attained.

We caution the inexperienced not to confound cassie with cassia, which has a totally different odour. (See ACACIA POMADE.)

CEDAR.—This wood has been famous since the days of Solomon, who employed it in the construction of the Temple. The wood now and then finds a place in a perfumer's warehouse; when ground, it does well to form a body of sachet powder. Slips of cedar wood are sold as matches for lighting lamps, because, while burning, an agreeable odour is evolved; some people use it also, in this condition, distributed among

clothes in drawers to 'prevent moth.' On distillation it yields an essential oil that is exceedingly fragrant, and which is used extensively for scenting what is called cold cream soap.

LEBANON CEDAR WOOD.

For the Handkerchief.

Otto of cedar	1 oz.
Rectified spirit	4 pints
Esprit rose trip	½ pint

Since the publication of the first edition of this work, otto of cedar wood, which was very scarce, has been sent extensively into the market. Messrs. Piesse & Lubin have produced an average of 28 ounces from 112 lbs. of shavings, being the refuse of the pencil-makers. The pencil cedar is the 'Virginian' or American cedar, *Juniperus virginiana.* The true Lebanon cedar, *Cedrus Libani*, and from which the handkerchief perfume is *named*, yields a very indifferent otto and odour to the American plant. The 'Cedars of Lebanon' are so familiar, however, that perfumers could not afford to change the title of the scent they make, for the red wood of the West, though the latter is superior to the former in fragrance.

Cedria, an oil or resin extracted from a cedar was, according to Vitruvius (a celebrated architect in the age of Augustus), used to smear over the leaves of the papyrus to prevent the attack of insects; and Pliny states that the Egyptians applied it with other drugs in the preparation of their mummies.

The tincture of cedar smells agreeably of the wood, from which it can readily be made by steeping the cedar wood in proof spirit. Its crimson colour, however, prohibits it from being used for the handkerchief. It forms an excellent tincture for the teeth, and is the basis of the celebrated French dentifrice '*eau Botot.*'

CEDRAT.—This perfume is procured from the rind of the citron fruit (*Citrus medica*), both by distillation and expression; it has a very beautiful lemony odour, and is much admired. It is principally used in the manufacture of essences for the handkerchief, being too expensive for perfuming grease or soap. What is called extract of cedrat is made by dissolving two ounces of the above essential oil of citron in one pint of spirits, to which some perfumers add half an ounce of bergamot.

CINNAMON.—Several species of the plant *Laurus Cinnamomum* yield the cinnamon and cassia of commerce. Its name is said to be derived from *China Amomum*, the bark being one of the most valued spices of the East. Perfumers use both the bark and the oil, which is obtained by distillation from it. The ground bark enters into the composition of some pastilles, tooth powders, and sachets. The essential oil of cinnamon is principally brought to this country from Ceylon; it is exceedingly powerful, and must be used sparingly. In such compounds where cloves answer, so will cinnamon.

Cinnamon is gathered when the tree is at least five years old. It is worked for thirty years, and yields two harvests annually. The branches are cut, the epidermis detached with a knife, a longitudinal fissure made in the bark, and the bark separated from the wood. Small rolls of the cinnamon are inserted within the larger ones, and they are dried in the sun. The aromatic and pleasant odour of cinnamon is well known, as is also its sweet piquant taste. The smell and flavour of Chinese cinnamon is not so agreeable.—(*Guibourt and Moquin-Tandon.*)

The *Cassia lignea*, which is the bark of the *Laurus Malabathrum*, is often employed as an aromatic and a spice. So are the leaves and flowers not full blown of various cinnamon trees. The seeds yield a greasy matter which is used in the preparation of scented tapers, burnt by the wealthy in the places where they are produced.

Mr. James Paton says:—

'The earliest glimpse we have of the spice trade gives us a most characteristic and vivid impress of the traffic of the early world. As the sons of Jacob had just completed the execution of their plot against their envied brother Joseph, on the horizon appeared "a company of Ishmaelites from Gilead, bearing spicery, balm, and myrrh, going to carry it down to Egypt." Thus 1,700 years before the Christian era we find the Arabs possessed of the spice trade, which their country, as a principal *entrepôt*, continued to hold down to the sixteenth century, when the whole system was overthrown by the discovery of the Cape passage. At this period Egypt was the capital of civilisation, learning, and luxury; and myrrh, cassia, and other odoriferous substances, we are informed by Herodotus, were used for embalming the dead and in religious ceremonies.'

The southern portion of Arabia, called Sabæa or Sheba, was peculiarly well situated for commanding the great trade in spices (hence the name Arabia Felix or Araby the Blest), lying in the direct route from the east to the west, commanding the great caravan route by the valley of the Euphrates to the shores of the Mediterranean, and just opposite the Regio Cinnamomifera, or Aromata, the north-east promontory of Africa, from which, and not from India, the main supply of the spices then used was drawn. The Sabeans had the necessary skill and enterprise for conducting this trade, and cunning did not fail them. They overclouded the mysteries of the prized commodities with fables, such as that cinnamon was gathered from the nests of the phœnix, which bird procured it in some miraculous way; that it was found in the land of the birth of Bacchus, in marshes guarded by winged serpents; that terrible bats flew at the eyes of those engaged in gathering cassia, and other such tales, all of which we presume served to keep up both the interest in and price of these spices, and to deter the much believing inhabitants of the early world from prosecuting such dangerous enterprises on their own account.

The wealth and glory of Arabia Felix, acquired through this spice trade, was the wonder of ancient times, and the writers revel in descriptions of the grandeur of its cities, and the magnificence of its merchants' houses. Milton alludes in one of his magnificent images to these perfumes—

'North-west winds blow
Sabean odours from the spicy shores
Of Araby the Blest.'

CITRON.

> Sharp-tasted citron, Median climes produce ;
> Large is the plant, and like a laurel grows ;
> And, did it not a *different scent* disclose,
> A laurel were. VIRGIL, *Georgics* II. 180.

On distilling the flowers of the *Citrus medica*, a very fragrant oil is procured, which is a species of neroli, and is principally consumed by the manufacturers of Hungary water. (See LIME.)

CITRONELLA.—Under this name there is an oil in the market, chiefly from Ceylon. It is procured by distilling the leaves of the *Andropogon Nardus*, which grows wild, and is very abundant in Ceylon. In the neighbourhoods of Galle and of Colombo, in that island, large tracts of land are under cultivation of this plant, for the express purpose of procuring the odoriferous principle.

The average export of citronella from the port of Colombo is about 40,000 lbs. annually.

Citronella being cheap (the export price at Colombo is 4*s.* 1*d.* per pound !), it is extensively used for perfuming soap ; what is now so generally sold as 'honey' soap is fine yellow soap slightly perfumed with this oil. Some few use it for scenting grease, but it is not much admired in that way.

This essence must not be confounded with those produced by other plants very different, although bearing the same name. There are, indeed, numerous plants, the odour of which more or less resembles that of citron. Among these may be mentioned the male southernwood (*artemisia abrolanum, synantherœ*) ; the melissa (*melissa officinalis, labiatœ*) ; the sweet verbena (*verbena tryphylla*) ; the *lipia citriodora*, and *aloysia citriodora*. (See VERBENA.)

It is stated by Wallich, according to Fleming, that the citron-smelling andropogon of Martinique is known in India as *lemon grass*, or as dogs'-grass citron. In Martinique a plant supposed

to be poisonous is confounded, under the name of citronella or andropogon, with the schœnanthus. It does, in fact, much resemble the schœnanthus but is larger, and diffuses a very pleasant smell of rose-geranium character. Growing specimens of these as well as numerous other plants, mentioned in this work, may be found in the Economic House at Kew.



CITRONELLA GRASS.

Citronella grass (*Andropogon Nardus*) is cultivated both by Mr. Fisher and by Mr. Winter, its otto being obtained by means of distillation. The importance of the trade in this one article in Ceylon alone may be estimated at 8,000*l.* annually. At Gaylang, Singapore, there are about 1,000 acres under citronella, lemon grass, and patchouly. Geranium grass otto is obtained from the *Andropogon Schœnanthus*. This grass, sometimes called ginger grass, is a wild plant of Central and Northern India ; its otto is produced by distillation, but it has not much reputation out of India.

CLOVES.—Every part of the clove plant (*Caryophyllus aromaticus*) abounds with aromatic oil ; but it is most fragrant and plentiful in the unexpanded flower-buds, which are the cloves of commerce. Cloves have been brought into the European market for more than

2,000 years. The plant is a native of the Moluccas and other islands in the Chinese seas. 'The average annual crop of cloves,' says Burnett, 'is from each tree 2 or 2½ lbs.; but a fine tree has been known to yield 125 lbs. of this spice in a single season, and as 5,000 cloves only weigh one pound, there must have been at least 625,000 flowers upon this single tree.'

The otto of cloves may be obtained by expression from the fresh flower-buds; but the usual method of procuring it is by distillation, which is carried on to a very great extent in this country. Few essential oils have a more extensive use in perfumery than that of cloves; it combines well with grease, soap, and spirit, and, as will be seen in the recipes for the various bouquets given hereafter, it forms a leading feature in some of the most popular handkerchief essences — Rondeletia, the Guards' Bouquet, &c.—and will be found where least expected. For essence of cloves, dissolve oil of cloves in the proportion of four ounces of oil to one gallon of spirit.



CLOVE.

The distilled water of the clove deposits pearly crystals of a substance named *eugenine*, the composition of which is the same as that of eugenic acid.

CUCUMBER.—Considerable difference of opinion exists among the public as to the odour of cucumber. Some greatly admire it, and think it has many virtues; others there are who think well of it on the side-board, but would expunge it from the toilet-table. Our business is not, however, to give opinion, but to state the mode of procuring the odour of the plant. We have been unable to procure any otto of cucumber, and the 'water' distilled from it has but a very faint resemblance

to the fruit: if, however, spirits of wine be repeatedly distilled over freshly-cut cucumbers, we finally obtain, at about the third distillation, a spirit or essence having all the true odour we are in search of. Its principal use is in making cucumber cold cream, &c., which see.

DILL.—Perfumers are now and then asked for 'dill-water;' it is, however, more a druggist's article than a perfumer's, as



DILL.

it is more used for its medicinal qualities than for its odour, which, by the way, is rather pleasant than otherwise. Some ladies use a mixture of half dill-water and half rose-water, as a simple cosmetic, 'to clear the complexion.'

The oil of dill is procured by submitting the crushed fruit of dill (*Anethum graveolens*) with water to distillation. The oil floats on the surface of the distillate, from which it is

separated by the recipient in the usual manner; after the separation of the oil, the 'water' is fit for sale. Oil of dill may be used with advantage, if in small proportions, and mixed with other oils, for perfuming soap.

EGLANTINE, or SWEET-BRIAR, notwithstanding what the poet Robert Noyes says,

> In fragrance yields,
> Surpassing citron groves or spicy fields,

does not find a place in the perfumer's 'scent-room,' except in name. This, like many other sweet-scented plants, does not repay the labour of collecting its odour. The fragrant part of this plant is destroyed more or less under every treatment that it is put to, and hence it is discarded. As, however, the article is in demand by the public, a species of fraud is practised upon them, by imitating it thus :—

Imitation Eglantine, or Essence of Sweet-Briar.

Spirituous extract of French rose pomatum . .	1 pint
„ „ cassie	¼ „
„ „ fleur d'orange	¼ „
Esprit de rose	¼ „
Otto of neroli	½ drachm
„ lemon grass (verbena oil)	½ „

ELDER (*Sambucus nigra*).—The only preparation of this plant, for its odorous quality, used by the perfumer, is elder-flower water. To prepare it, take nine pounds of elder flowers, free from stalk, and introduce it to the still with four gallons of water; the first three gallons that come over is all that need be preserved for use; one ounce of rectified spirit should be added to each gallon of 'water' distilled, and when bottled it is ready for use.

KREMBS recommends the following process for making a concentrated elder-flower water, from which he states the

ordinary water can be extemporaneously prepared, of excellent quality, and of uniform strength :—

12 lbs. of the flowers are to be distilled with water until that which passes into the receiver has lost nearly all perfume. This will generally happen when from 15 lbs. to 18 lbs. have passed over. To the distillate, 12 lbs. of alcohol are to be added, and the mixture distilled until about 5 lbs. are collected. This liquor contains all the odour of the flowers. To make the ordinary water, 2 ounces of the concentrated water are to be added to 10 ounces of distilled water.—*Buchner's Report.*

Other preparations of elder flowers are made, such as milk of elder, extract of elder, &c., which will be found in their proper place under Cosmetics. Two or three new materials made from this flower will also be given hereafter, which are likely to meet with a very large sale on account of the reputed cooling qualities of the ingredients : of these we would call attention more particularly to cold cream of elder flowers, and to elder oil for the hair.

The preparations of the elder flowers, if made according to the Pharmacopœias, are perfectly useless, as the forms therein given show an utter want of knowledge of the properties of the materials employed.

In Nichols's 'Progress of Queen Elizabeth' he mentions that at Hawkstead, among the rooms on the ground-floor, was one called the still-room, an apartment where ladies of the Court much amused themselves in distilling fragrant waters. In the Northumberland 'Household Book,' a work so often quoted by historical writers, there appears the following list of plants, viz. 'Roses, Borage, Fumitory, Purcelly, Balme, Walnut leaves, Sage, Elder flowers, &c., for the use of the still-room.' The still-room maid to this day preserves her name, though not all her old avocation. The cymes of the elder, after being plucked and placed in a heap, very quickly heat ; the corollas then fall off and are separated, by sifting, from the stalks. During the season many tons of

these are sold by Covent Garden herbalists. Of corollas 9 lbs. are distilled with 4 gallons of water; the first 3 gallons that come over only are preserved for used under the title of Elder-flower water.

EUCALYPTUS.—This tree-shrub belonging to the genera of MYRTACEÆ is indigenous to Australia; one of its near allies, the MELEUCA, yields by distillation of its leaves the *Cuiam ponti*, or, as is known with us, CAJEPUT oil, of no sweet savour, but yet valuable in pharmacy. Mr. Bosisto, of Richmond in Victoria, made a very valuable 'exhibit' of products from the Eucalyptus at the Paris Exhibition, 1867. In his circular, after speaking of the value of the oils from Eucalyptus in a medicinal point of view in lieu of Cajeput, and also of its solvent powers over copal, &c., goes on to observe that—

> Both in England and Australia these oils have been found useful in the manufacture of perfumery, especially in aromatising soaps. They make good basic odours; and it is important to remark that their aroma can be materially altered, on account of the readiness with which they yield up their own identity on the addition of essential oils in consonance with them—

a dictum with which we cannot agree so long as perfumery remains a science of *sweet odours!* Eucalyptus has an odour between good turpentine and cajeput, neither of which are 'sweet to smell:' it would therefore be worse than flattery to induce, even by kind expression towards his labours, him or others to believe that the oil of Eucalyptus will ever be used in perfumery, except in name; or, when so employed, but as a sanitary agent.

FENNEL (*Fœniculum vulgare*).—Dried fennel herb, when ground, enters into the composition of some sachet powders. The oil of fennel, in conjunction with other aromatic oils, may be used for perfuming soap. It is procurable by distillation.

FLAG (SWEET) (*Acorus calamus*).—The roots, or rhizome, of the sweet flag, yield by distillation a pleasant-smelling otto ; 1 cwt. of the rhizome will thus yield one pound of oil. It can be used according to the pleasure of the manufacturer in scenting grease, soap, or for extraits, but requires other sweet oils with it to hide its origin.

The true sweet flag is a very odorous root, yellowish outside, whitish within, showing black specks on its lower part, the traces of radicles, and transverse lines on the upper part, whence the leaves shoot. It must not be confounded with the bulbs of gladiolus, which are inodorous and belong to the iridaceæ.

The true acorus is often sold as the *Calamus aromaticus* of the ancients, which was very different and probably belonged to the family of the Gentianaceæ.

FRANGIPANNI (*Plumeria Alba*). —This plant, which is said to yield the ' eternal perfume,' so popular at the present day, is a native of the West India Islands. In Antigua and at St. Domingo it grows in great abundance. Having, through my friend H. Bridger, Esq., of the former place, obtained a few of the plants, I forwarded them to the Royal Gardens, Kew. The following remarks thereon by Sir W. Hooker are worthy of record :—

Royal Gardens, Kew, *August* 14.

MY DEAR SIR,

I thank you much for the Frangipanni plants. One, and one only, shows life ; but I have every reason to think it will recover, and then, and not till then, we shall see exactly what species of Plumeria it is.

I do not find in your work that the odour of the flowers is preserved and used in this country. A French author (Descoursilz, in his ' Flore des Antilles ') says, ' Les parfumeurs recherchent cette odeur fugace, qu'ils savent fixer dans leurs pommades et leurs huiles cosmétiques.' This is

said of Plumeria *alba*; but all the species, and there are several, have the same agreeable odour when living. *Our* Floras of the West Indies do not speak of such a use being made of the flowers. You have the power of imitating it from other vegetables.

On looking further into this subject, I find it stated by Sir James Smith that the French name of all the species is Frangipanni, and that they are so called from the resemblance of their fragrance, to a well-known perfume of France, '*Frangipanni*;' its inventor, an Italian, was of the *Frangipanni family*, so conspicuous in the Roman disturbances.

I suspect, then, that no perfume is derived from these flowers: the *real Frangipanni* being derived from other flowers, as described in your work, 2nd edition.

Very truly yours,
W. J. HOOKER.

P.S. The juice of all the Plumerias is milky and very poisonous. One species was in flower with us last week.

To S. PIESSE, Ph.D., F.C.S.

FRANKINCENSE, or OLIBANUM (see OLIBANUM.) Although there has been much research, the trees which produce this resinous gum are but imperfectly known. The best discourse upon this subject is to be found in the 'Transactions of the Linnæan Society,' vol. xxvii., p. 111, by Dr. Birdwood. It is stated that the gum is obtainable from several species of *Boswellia*, growing in the hot and arid regions of Eastern Africa and of the Southern coast of Arabia, the Soumali country, and near Aden.

As exemplifying the great esteem in which frankincense was held by the ancients, the memorable gifts presented by the Magi to the infant Saviour will occur to every mind. Herodotus relates that the Arabians paid to Darius, king of Persia, an annual tribute of 1,000 talents of frankincense. Constantine made offerings to the church of Rome costly vessels containing *Aromata in incensum*, which is understood as olibanum.[1]

GERANIUM (*Pelargonium Capitatum*, rose-leaf geranium). —The leaves of this plant yield by distillation a very agreeable rose-smelling otto, so much resembling real otto of

[1] *Pharmacographia.*

rose that it is used very extensively for the adulteration of that valuable scent, and is grown very largely for that express purpose. It is principally cultivated in the south of France, and in Turkey (by the rose-growers). In the department of Seine-et-Oise, at Monfort-Lamaury, in France, hundreds of acres of it may be seen growing. The geranium is propagated by cuttings made in September, which are planted out in the spring. If the land has been well manured, and if the season be very dry, the plants are well irrigated. They grow to a height of three to four feet, yielding an abundance of foliage, which is easily garnered by the sickle. One hundred-weight of leaves will yield about two ounces of essential oil. Used to adulterate otto of rose, it is in its turn itself adulterated with ginger-grass otto (*Andropogon*), and thus formerly was very difficult to procure genuine; on account of the increased cultivation of the plant, it is now, however, easily procured pure. Some samples are greenish-coloured, others nearly white, but we prefer those of a brownish tint.

When dissolved in rectified spirit, in the proportion of about eight ounces to the gallon, it forms the *Extract of Rose-leaf Geranium* of the shops.— A word or two is necessary about the oil of geranium, as much confusion is created respecting it, in consequence of there being an otto under the name of geranium, but which in reality is derived from one of the *Andropogons*, cultivated in the Moluccas. This said andropogon (geranium!) oil can be used to adulterate the true geranium, and hence we suppose its nomenclature in the drug markets. The genuine rose-leaf geranium otto fetches about 3*s.* per ounce, while the andropogon oil is not worth more than that sum per pound. And we may observe here that the perfuming essential oils are best purchased through the wholesale perfumers, as from the nature of their trade they have a better knowledge and means of obtaining the

real article than the drug broker. On account of the pleasing odour of the true oil of rose-leaf geranium, it is a valuable article for perfuming many materials, and appears to give the public great satisfaction. Recently some fine samples of otto of geranium have been brought to England, being the produce of Spain, very nearly as good as the otto imported from Grasse. It was sold at 3*s.* 6*d.* per ounce.

Several varieties of the Natural Order Geraniaceæ bear



SCENT-YIELDING GERANIUM.

scent-yielding leaves; but although these plants were introduced into Europe from the Cape of Good Hope so far back as 1690, it was not until 1847 that the *Pelargonium capitatum* began to be systematically grown for the purpose of extracting its scent-yielding principle, known in commerce as the Otto of Rose-leaf Geranium. This was first done by M. Demarson, of Paris; and since that time its cultivation has vastly increased in France, particularly at Montfort-Lamaury, in the Department of Seine-et-Oise, and it has even more

rapidly spread in Algeria, Mr. Monk, an Englishman, and M. Chiris pushing its production extensively. The same kind of culture is also carried on in Spain, by Señor Robillard, of Valentia. The propagation of the Pelargonium by means of slips is too well known to need description. One ton weight of leaves will yield by distillation an average of two pounds weight of otto, the lowest wholesale price of which is, say, 6*l*. Señor Robillard has about fifty acres of Rose Geranium under tillage, more or less, according to the demand. He strikes the cuttings from September to October, and puts them out in April; the plants have to be replaced every three or four years at longest, the land being well manured annually. About 3,000 plants are required per acre.

HEDIOSMIA.—A scent supposed to be derived from the *Hedyosmum*, an indigenous shrub of Jamaica.

HELIOTROPE.—Either by maceration or enfleurage with clarified fat, we may obtain this fine odour from the flowers of the *Heliotropium peruvianum* or *H. grandiflorum*. Exquisite as the odour of this plant is, at present it is not applied to use by the manufacturing perfumer. This we think rather a singular fact, especially as the perfume is powerful and the flowers abundant. We should like to hear of some experiments being tried with this plant for producing its odour in this country, and for that purpose now suggest the mode of operation which would most likely lead to successful results. For a small trial in the first instance, which can be managed by any person having the run of a garden, we will say, procure an ordinary glue-pot now in common use, which melts the material by the boiling of water; it is in fact a water bath, in chemical parlance—one capable of holding a pound or more of melted fat. At the season when the flowers are in bloom, obtain a pound of fine lard; melt the lard and strain it through a close hair-sieve; allow the liquefied fat, as it falls from the sieve, to drop into cold spring water; this operation granulates

and washes the blood and membrane from it. In order to start with a perfectly inodorous grease, the melting and granulation process may be repeated three or four times, using a pinch of salt and a pinch of alum in each water; it is then to be washed five or six times in plain water; finally, remelt the fat; and cast it into a pan to free it from adhering water.

Now put the clarified lard into the macerating pot, and place it in such a position near the fire of the greenhouse, or elsewhere, that will keep it warm enough to be liquid; into the fat throw as many flowers as you can, and there let them remain for twenty-four hours; at this time strain the fat from the spent flowers and add fresh ones; repeat this operation for a week: we expect at the last straining the fat will have become very highly perfumed, and when cold may be justly termed *Pommade à la Héliotrope.*

The cold pomade being chopped up, like suet for a pudding, is now to be put into a wide-mouthed bottle, and covered with spirits as highly rectified as can be obtained, and left to digest for a week or more; the spirit then strained off will be highly perfumed; in reality it will be *extract of heliotrope*, a delightful perfume for the handkerchief. The *rationale* of the operation is simple enough; the fat body has a strong affinity or attraction for the odorous body, or essential oil of the flowers, and it therefore absorbs it by contact, and becomes itself perfumed. In the second operation the spirit has a much greater attraction for the fragrant principle than the fatty matter; the former, therefore, becomes perfumed at the expense of the latter. The same experiment may be repeated with almond oil substituted for the fat, or the process of enfleurage may be adopted.

The experiment here hinted at may be varied with any flowers that there are to spare; indeed, by having the macerating bath larger than was mentioned above, an excellent *millefleur* pomade and essence might be produced from every

conservatory in the kingdom, and thus we may receive another enjoyment from the cultivation of flowers beyond their beauty of form and colour.

We hope that those of our readers who feel inclined to try experiments of this nature will not be deterred by saying, 'They are not worth the trouble.' It must be remembered that very fine essences realise in the London perfumery warehouses 16*s.* per pint of 20 ounces, and that fine *flower-scented* pomades fetch the same sum per pound. If the experiments are successful, they should be published, as then we may hope to establish a new and important manufacture in this country, or our warm colonies. But we are digressing.

The perfume of heliotrope is perfectly extracted by means of sulphuret of carbon by Millon's process as modified by Piver.

The odour of heliotrope resembles a mixture of almonds and vanilla, and is well imitated thus :—

Extract of Heliotrope.

Spirituous extract of vanilla	½ pint
„ „ French rose pomatum . . .	¼ „
„ „ orange-flower pomatum . . .	2 oz.
„ „ ambergris	1 „
Essential oil of almonds	5 drops.

A preparation made in this manner under the name of *Extrait de Héliotrope* is that which is sold in the shops of Paris and London, and is really a very nice perfume, passing well with the public for a genuine extract of heliotrope.

Piver, a Paris perfumer, has obtained from one hectare of land a quantity of flowers, from which he extracted by Millon's process 6 kilogrammes of perfume of heliotrope, worth 3,000fr. Of this perfume, 4 grammes is sufficient to scent in an exquisite manner a kilogramme of pomatum. It is not injured by exposure to the air, and has enough stability, even when not dissolved by alcohol, to bear, without loss of weight or of intensity, being kept in open vessels.

HONEYSUCKLE, or WOODBINE—

> Copious of flower the woodbine, pale and wan,
> But well compensating her sickly looks
> With never-cloying odours.

What the poet Cowper here says is quite true; nevertheless, it is a flower that is not used in practical perfumery, though there is no reason for abandoning it. The experiments suggested for obtaining the odour of Heliotrope and Millefleur (thousand flowers) are also applicable to this, as also to Hawthorn. A good

Imitation of Honeysuckle

is made thus:—

Spirituous extract of rose pomatum	1 pint
„ „ violet	1 „
„ „ tubereuse	1 „
Extract of vanilla	¼ „
„ tolu	¼ „
Otto neroli	10 drops
„ almonds	5 „

The prime cost of a perfume made in this manner would probably be too high to meet the demand of a retail druggist; in such cases it may be diluted with rectified spirit to the extent 'to make it pay,' and will yet be a nice perfume. The formula generally given herein for odours is in anticipation that when bottled they will retail for at least eighteen-pence the fluid ounce; which is the average price put on the finest perfumery by the manufacturers. The honeysuckle belongs to the family of the Caprifoliaceæ (*lonicera caprifolium*).

HOPS.—The flowers of the hop plant, *Humulus lupulus*, yield a fragrant otto by distillation. On distilling a pocket, about 120 lbs., of new hops of best Kent quality, I procured just eight ounces of fragrant otto, limpid, and of a bay green colour. A similar quantity of three year old Bavarian hops yielded eleven ounces of otto. The workmen were warned in case of its supposed narcotic action, but no such effects in the

least degree were noticed. I have not yet employed it in perfumery; but I cannot tell how soon it may be, since people have taken a liking to, and repeatedly asked for, a perfume so unflowery as Russian leather!

HOVENIA.—A perfume under this name is sold to a limited extent; but if it did not smell better than the plant *Hovenia dulcis* or *H. inæqualis*, a native of Japan, it would not sell at all. The article in the market is made thus :—

Imitation Essence of Hovenia.

Rectified spirit	1 quart
Rose-water	½ pint
Otto lemons	½ oz
„ rose	1 drachm
„ cloves	½ „
„ neroli	10 drops.

First dissolve the ottos in the spirit, then add the rose-water. After filtration it is ready for sale. When compounds of this kind do not become bright by passing through blotting-paper, the addition of a little carbonate of magnesia prior to filtering effectually clears them. The water in the above recipe is only added in order that the article produced may be retailed at a moderate price, and would, of course, be better without that 'universal friend.'

The stalks of the hovenia, when they become fleshy, are eaten by the Japanese. According to Kæmpfer they taste like the pear.

HYSSOP (*Hyssopus officinalis*).—This plant yields by distillation an essential oil, which is sometimes used in ordinary perfumeries, but more particularly by the distillers who deal in liqueurs. When recently prepared it is colourless, but in contact with the air becomes yellow as it changes to a resin. It boils at about 160° (cent.); but the boiling point is sometimes as high as 180°, which indicates that it consists of at least two essences.

ILANG-ILANG (*Cananga odorata*).—This plant grows abundantly in the Philippine Islands, and is especially cultivated



FLOWERS AND FRUIT OF CANANGA ODORATA.

in Manilla by M. Julien, of Westembayan, to whom I am indebted for the illustrations from which the annexed woodcuts were prepared. The true Ilang-Ilang (Flower of Flowers)

yields, by distillation of its blossoms, a minute quantity of an



CHAMPACA (MICHELIA CHAMPACA), OR FALSE ILANG.

otto resembling the odour of the flower from which it is derived. The value of this otto, when pure, is from 18*s.* to 22*s.*

per oz. in the European perfume market. Unfortunately, however, there grows in the same country the Champaca tree, which yields an otto, by distillation of its leaves, somewhat resembling in fragrance that of the Ilang-Ilang, but of little more commercial value than the otto of Pimento, which realises 2*s.* per oz. With this the true Ilang-Ilang is frequently adulterated.

The otto of Ilang-Ilang has not been introduced into Europe more than about sixteen years; but the price that it fetches, when pure, shows that it occupies a prominent place amongst perfumes.

The odour of Ilang has but little force: hence it requires an unusual quantity of its otto to make a fair average handkerchief scent, as will be seen by the following recipe for

Ilang-Ilang Extract.

Alcohol (60 over proof)	1 gallon
Ilang otto	6 oz.

The cost of this perfume makes it far above the average of others, and is very fleeting in fragrance. A blended perfume containing otto of Ilang, giving more satisfaction to the public than the above recipe, may be made thus:—

Ilang-Ilang (blended).

Alcohol (60 over proof)	1 pint
Otto ilang	1 oz.
Otto pimento	¼ oz.
Orris tincture	2 pints
Esprit rose, triple	1 pint
„ „ pom	1 „
„ tubereuse	1 „
„ cassie	1 „
„ jasmine	1 „
	1 gallon.

It will be seen that this mixture contains otto of pimento;

the reason of its use is because, although Ilang-Ilang has a flower scent, it also has 'that within' which imparts a spice odour, as may also be observed in the common clove pink and stock of English gardens.

The Cananga odorata is often spelled *Ylang*, also *Ihlang*: the fact is the plant is unknown to European botanists; few, indeed, grasp the Malay tongue.

JASMINE.

Luxuriant above all,
The jasmine throwing wide her elegant sweets.

This flower is one of the most prized by the perfumer. Its odour is delicate and sweet, and so peculiar that it is without comparison, and as such cannot be imitated. When the flowers of the *Jasminum odoratissimum* are distilled, repeatedly using the water of distillation over fresh flowers, a kind of sweet-smelling essence is obtained which ultimately offers a perfume of jasmine. It is, however, exceedingly rare, on account of the enormous cost of production. There was a fine sample of six ounces exhibited in the Tunisian department of the Exhibition, 1862, the price of which was 9*l.* the fluid ounce! The plant is the Yasmyn of the Arabs, from which our name is derived.

The cultivation of the jasmine is very extensive at Cannes (du Département du Var) in the south of France. The manufacturing perfumers there do not grow all the jasmine they consume, but are supplied every morning in the season, with small lots of flowers, from various cottagers, who have little plots of the plants. The cost of these flowers is from two to three francs the kilogramme, equal to about 1*s.* 6*d.* to 2*s.* 6*d.* the pound; in this way the principal houses receive daily from one to two hundredweight of blossoms! The cultivated jasmine differs from that jasmine we have in England, inasmuch as the blossoms are four times the size of the British or wild jasmine; the plant also grows more like a

small bush, and, not being a creeper, requires no supports ; it is, in fact, the *Jasmin grandiflora* of the botanists. Its growth and cultivation resemble very much that of English lavender.



JASMIN GRANDIFLORA.

Alphonse Karr has thus described a sale of some jessamines at Nice :—

The other day I saw two cultivators in a garden ; one was buying of the other four thousand Spanish jessamine roots. I was not present at the struggle, but it must have been hot and passionate. When I arrived, the sale of the jessamines was concluded. The ordinary price of the

Spanish jessamine is from three to five francs the hundred roots. These jessamines were splendidly loaded with large white flowers and pinkish violet buds. The buyer took a pickaxe and uprooted them. I thought he was mad. For jessamines torn up in full flowering, in the month of August, would in France be considered entirely lost, and fit only to be tied up in bundles for firewood. But this man, instead, carried his jessamines home, planted them in the ground, threw a few buckets of water over them, and left them to themselves. Three days afterwards I went to see them ; they were in splendid condition, and had not ceased flowering.

The jasmine is cultivated upon stems of the wild jasmine (that which is seen in our English gardens) grafted at the end of two years with the Spanish jasmine.

This produces a blossom the size of a shilling, of intense fragrance. Jasmine requires a moist soil, or so situated that it can be irrigated. The distance of planting out the jasmine is the same as for the rose; it must be very liberally pruned every year. The flowers of the jasmine are produced from July to the end of October, but those of August and September are the most fragrant. About fifty days, or fifty successive inflowerings of fresh blossoms, produces the finest jasmine fat. It requires about eight thousand plants to stock an acre; and they are not in full bearing till the second year after grafting; but when mature, every thousand plants yield about sixty pounds' weight of flowers annually. They are planted in rows, horizontal poles being thrust between them for support, the branches being woven in and out, somewhat as the raspberry canes are arranged by the Chiswick gardeners. Every August—the jasmine season—the fields are alive with women, old and young, and children, each having a little basket at her side suspended by a strap across her shoulders, both hands actively engaged in picking the flowers, and filling the baskets. As each basket is filled it is conveyed to the shaded laboratory and there weighed. An acre of land will yield about five hundred pounds' weight of jasmine blossoms.

In the perfumer's laboratory, the method of obtaining the odour is by absorption, or, as the French term it, *enfleurage*; that is, by spreading a mixture of pure lard and beef suet on a glass tray (*châssis en verre*), and sprinkling the fresh-gathered flowers all over it, leaving them to stand a day or so, and repeating the operation with fresh flowers during the whole time the jasmine plant is in blossom, which is for more than six weeks; the grease absorbs the odour. Finally, the pomade is scraped off the glass, melted at as low a tempera-



GATHERING JASMINE BLOSSOMS.

ture as possible, and strained. It requires at least three kilogrammes of flowers to perfume one kilogramme of grease.

Oils strongly impregnated with the fragrance are also prepared much in the same way. Cotton cloths (*molleton de coton*), previously steeped in olive oil, are covered with jasmine flowers, which is repeated several times; finally, the cotton cloths are squeezed under a press. The jasmine oil thus produced is the *Huile antique au jasmin* of the French houses. (See ENFLEURAGE.)

The extract of jasmine is prepared by pouring rectified spirit on the jasmine pomade or oil, and allowing them to

remain together for a fortnight, at a summer heat. The best quality extract requires two pounds of pomatum to every quart of spirit. The same can be done with the oil of jasmine. If the pomade is used, it must be cut up fine previously to being put into the spirit; if the oil is used, it must be shaken well together every two or more hours, otherwise, on account of its specific gravity, the oil separates, and but little surface is exposed to the spirit. After the extract is strained off, the 'washed' pomatum or oil is still useful, if remelted, in the composition of pomatum for the hair, and gives more satisfaction to a customer than any of the 'creams and balms,' &c., &c., made up and scented with essential oils; the one smells of the flower, the other Barberous.

The extract of jasmine enters into the composition of a great many of the most approved handkerchief perfumes sold by the English and French perfumers. The extract of jasmine made in England is much finer than the French, on account of the inodorous quality of the British spirit. Extract of jasmine is sold for the handkerchief often pure, but is one of those scents which, though very gratifying at first, becomes what people call 'sickly' after exposure to the oxidising influence of the air, but, if judiciously mixed with other perfumes of an opposite character, is sure to please the most fastidious customer.

In Turkey the jasmine is cultivated for a different purpose. By reserving only a single axis to each stalk, they obtain the beautiful straight stems which are used in the manufacture of pipe-tubes.

Essence of jasmine, when cooled down to 0°, deposits a white stearopten, crystalline, inodorous, fusible at 125°, hardly soluble in water, easily soluble in spirit and ether.

JONQUIL.—The scent of the jonquil is very pleasing; for perfumery purposes it is, however, but little cultivated in comparison with jasmine and tubereuse. It is prepared

exactly as jasmine. The Parisian perfumers sell a mixture which they call 'extract of jonquil.' The plant, however, only plays the part of a godfather to the offspring, giving it its name. The so-called jonquil is made thus :—

Imitation Extract of Jonquil.

Spirituous extract of jasmine pomade . . .	1 pint
„ tubereuse	1 „
„ fleur d'orange . . .	½ „
Extract of vanilla	2 fluid oz.

True Extract of Jonquil.

Jonquil pomade	8 lbs.
Spirit (60 over proof)	1 gallon.

Let it stand one month.

The jonquil is produced by the *Narcissus Jonquilla*, of the family of the Amaryllidaceæ.

KOOSHT, or COSTUS. Balfour says that the root of the Aucklandia Costus has an aromatic odour, and is used in Northern India as incense; in Bengal this same is called Puchak. I have made some experiments with a sample of Koosht which was sent to me by Mr. Collins, the curator of the Museum of the Pharmaceutical Society: it appears to be scarcely as odorous as orris root. The tincture has an agreeable smell and would be useful, but no quantity has yet been seen in our markets.

Since the above experiments, I have imported two hundredweight of costus, and which I find far superior to the original sample; being newer, it is more fragrant. Five lbs. of it to one gallon of spirit makes an excellent tincture, and will certainly come into use as a base for several perfumes.

LAUREL.—By distillation from the leaves of the *Prunus Laurocerasus*, or cherry laurel, an oil and perfumed water are procurable, of a very pleasant and fragrant character. Commercially, however, it is disregarded, as, from the similarity of odour to the oil distilled from the bitter almond, it is

rarely, if ever, used by the perfumer, the latter being more economical.

LAVENDER.

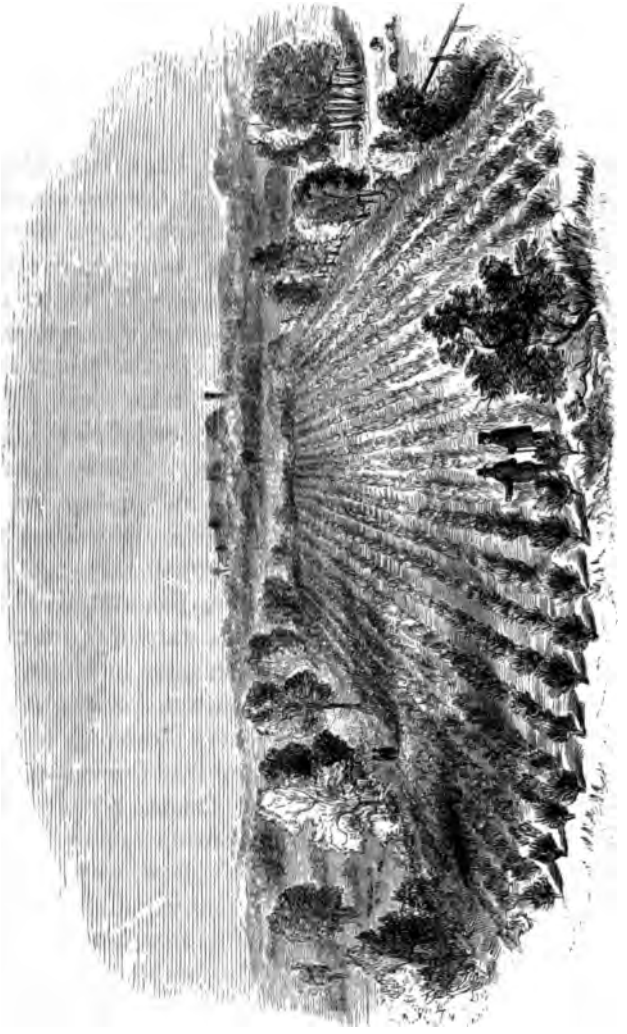
> In each bright drop there is a spell,
> 'Tis from the soil we love so well,
> From English gardens won.

The climate of England appears to be better adapted for the perfect development of this fine old favourite perfume than any other on the globe. 'The ancients,' says Burnett, 'employed the flowers and the leaves to aromatise their baths, and to give a sweet scent to water in which they washed; hence the generic name of the plant, *Lavandula*.'

Lavender is grown to an enormous extent at Mitcham, in Surrey, and at Hitchin, in Herts, by Mr. Perks, which are the places of its production in a commercial point of view. Very large quantities are also grown in France. What is called the Alpine lavender of France is remarkably good; but the fine odour of the British produce realises in the market four times the price of that of Continental growth. Burnett says that the oil of *Lavandula Spica* is more pleasant than that derived from the other species; but this statement must not mislead the purchaser to buy the French spike lavender, as it is not worth a tenth of that derived from the *Lavandula vera*. Half a hundredweight of good lavender flowers yields, by distillation, from fourteen to sixteen ounces of essential oil.

Lavandula vera is a native of Persia, the Canaries, Barbary, and the south of Europe, from the last of which it is said to have been first brought to England, where, finding a congenial soil, and being carefully cultivated, it yields an essential oil, or *otto*, very far superior to that produced from it in its original places of growth. The peculiar qualities of most plants are susceptible of change, and in many instances of improvement, by cultivation; but none, perhaps, more so than this. It is not even in all parts of this country that it

can be grown with success, and for many years it was sup-



PIESSE AND LUBIN'S MITCHAM LAVENDER FIELD, NEAR THE CRYSTAL PALACE, SURREY.

posed that it would only come to perfection in the neighbour-

hood of Mitcham, in Surrey; but it has, within the last half century, been found that a soil and climate equally suited to its growth exists near Hitchin, in Hertfordshire. There the finest otto is now produced from its flowers, by Mr. S. Perks, from whom we have received the following account of his mode of its cultivation and treatment:—

The ground for a plantation of lavender should not be surrounded by high hedges, or in the immediate neighbourhood of any trees, which tend to retain too much moisture upon the plants, and thus cause the spring frost to cut off the flowers, but should be as much exposed to the sun as possible.

In October, a large number of slips from the old plants are placed in previously prepared beds, where they are allowed to remain for twelve months, during which time they are carefully clipped. When a year old, they are planted out (in fine weather) in rows four feet apart, with a space of three feet from plant to plant, but are not allowed to flower, the clipping being still continued, in order to strengthen them, which object is further promoted by a regular supply of short manure to the roots. If this cannot be procured in sufficient quantity, its place may be supplied by superphosphate of lime, which greatly improves the appearance of the plant, and causes it also to produce finer flowers.

The usual mode of procuring the otto is to put the flowers and stalks into a still with sufficient water, and thus draw off the oil; but I have found by experiment that very little is produced from the stalks, and that little of inferior quality. My present practice is therefore to employ only the flowers, which are stripped from the stalks previously to the distillation; and though this is necessarily a more expensive way of proceeding, the superior quality of the product enhances its value in an equal degree, whilst the loss in quantity is very small. The aroma of the otto produced by this process is so far superior to that of any other, as to be at once perceptible to every one accustomed to the use of an inferior kind, and even to those who may be said to have an entirely uneducated sense of smelling. It is, in fact, a pure otto, and when suitably combined with other appropriate materials, produces 'Lavender Water' of the most exquisite fragrance that has hitherto been made.

Since the publication of the last edition of this work, I have had twelve years' possession of the stillery and lavender land adjoining in the Mitcham Road, the very centre of the Surrey flower farms. I have thus added to former knowledge

some practical experience in the field, and in the still-house, not only with lavender, but with most of the other plants cultivated at Mitcham, such as white peppermint, black peppermint, pennyroyal, camomile, Provence and Damask roses, rosemary, &c. The remarks I have to make in reference to these plants will be found under their several headings.

The number of lavender plants upon an acre of ground would be about 3,547 ; that is, if planted one yard apart and four feet between the rows. An acre would yield about six to seven quarts of otto, but it depends upon the age of the plants ; the latter, when about four years old, produce most.

Every fourth year the old lavender plants are taken up, and the crop upon the land is changed to that of potatoes, or some other, and it is here the practical farmer has to decide. In the cases of some lands at Mitcham, lavender can be grown for even six years, by judiciously removing worn plants, and inserting young ones. Severe frost will often kill rows of plants, and their place must be renewed. At the end of August or early in September the lavender is fit to garner : it is cut with a sickle, and is then laid upon a mat (these mats are the common Indian bas matting), which will hold an average of half a hundredweight each, and are then delivered at the still-house. At my Mitcham stillery I have two stills ; one will hold twenty mats, or say half a ton of lavender, and half a ton of water for its distillation ; the lesser still works about three quarters of this quantity. Each still is worked over three times during every twenty-four hours—the work is continuous night and day. Thus for charging the still and firing one hour is allowed ; the distillation will then continue for six hours, when another hour of heavy work is used in discharging the still of the spent plant and getting ready for a new charge. Twenty mats of lavender thus distilled will yield (an average of seven years) sixteen pounds of otto. This otto at Mitcham is always divided into Firsts (1sts) and Seconds

(2nds). The firsts or best will be 15 lbs., the seconds 1 lb. The last otto that runs is undoubtedly inferior to the first by one half the market value of the firsts.

All the inferior descriptions of oil of lavender are used for perfuming soaps and greases; but the best, that obtained from the Mitcham and Hitchin lavender, is entirely used in the manufacture of what is called lavender water, but which, more properly, should be called essence or extract of lavender, to be in keeping with the nomenclature of other essences prepared with spirit.

The number of formulæ published for making a liquid perfume of lavender is almost endless; but the whole of them may be resolved into essence of lavender, simple; essence of lavender, compound; and lavender water.

There are two methods of making essence of lavender:—1. By distilling a mixture of essential oil of lavender and rectified spirit; and the other—2. by merely mixing the oil and the spirit together.

The first process yields the finest quality; it is that which is adopted by the firm of Smyth & Nephew, whose reputation for this article is such that it gives a good character in foreign markets, especially India, to all products of lavender of English manufacture. Lavender essence, that which is made by the still, is quite white; while that by mixture only always has a yellowish tint, which, by age, becomes darker and resinous.

Smyth's Lavender.

To produce a very fine distillate, take

Otto of English lavender	4 oz.
Rectified spirit (60 over proof)	5 pints
Rose-water	1 pint

Mix and distil five pints for sale. Such essence of lavender is expensive, but at 10*s.* a pint of 14 oz. (!) there *is* a margin

for profit. If not being convenient to the general dealer to sell distilled lavender essence, the following form, by mixture, will produce a first-rate article, and nearly as white as the above :—

Essence of Lavender.

Otto of lavender	6 oz.
Rectified spirit	1 gallon

The perfumer's retail price for such quality is 10*s.* per imperial pint of 20 oz.

Many perfumers and druggists, in making lavender water or essence, use a small portion of bergamot, with an idea of improving its quality—a very erroneous opinion; moreover, such lavender quickly discolours.

Lavender Water.

English oil of lavender	4 oz.
Spirit	3 quarts
Rose-water	1 pint

Filter, and it is ready for sale.

Common Lavender Water.

Same form as the above, substituting French lavender for the British.

Recipes for Rondeletia, Lavender Bouquet, and other lavender compounds, will be given when we come to speak of compound perfumes, which will be reserved until we have finished explaining the method of making the simple essences.

The *Lavandula vera*, D. C., is called female lavender; and the *Lavandula Spica*, male lavender.

LEMON.—This fine perfume is abstracted from the *Citrus Limonum*, by causing the fruit to revolve in a metal cup[1] lined with spikes, this process producing the first quality; by expression, and also by distillation from the rind of the fruit. That which is procured by expression has a much finer odour and a more intense lemony smell than the distilled product.

[1] See Illustration of the Ecuelle under LIME.

As a distinction the first quality and the expressed lemon is called CITRON ZESTE, and the distilled quality is known as Ess. Lemon. The importation of from 85,000 lbs. to 90,000 lbs. weight of otto of lemon annually into England proves that Britannia has a great liking for this scent, which is extracted by rasping the fruit and afterwards expressing the pulp so produced of the *Citrus Limonum.* The otto of lemons in the market is principally from Messina, where there are hundreds of acres of 'lemon groves;' indeed, the extraction of the ottos of lemon, orange, and bergamot constitutes the chief industry of Sicily, particularly in the vicinity of Palermo. In the spiked cup or drum 100 or more lemons are operated on at one time. No doubt, sooner or later, steam will be employed to rotate these drums, and thus we may expect the supply of these scents to be kept equal to the demand. Nevertheless, as the land of Italy is already occupied, there is ample room in European markets for similar ottos, should they be produced in Australia. Otto of lemons, like all the ottos of the Citrus family, is prone to rapid oxidation when in contact with air and exposure to light; a high temperature is also detrimental, and as such is the case, the otto should be preserved in a cool cellar. Most of the samples from the gas-heated shelves of the druggists' shops are as much like essence of turpentine, to the smell, as that of lemons; rancid oil of lemons may, in a great measure, be purified by agitation with warm water and final decantation. The following remarks, made by Mr. Cobb, of Yarmouth, are useful:—

> Being constantly anncyed by the deposit and alteration in my essence of lemons, I have tried various methods of remedying the inconvenience.
>
> I first tried redistilling it, but besides the loss consequent on distilling small quantities, the flavour is thereby impaired. As the oil became brighter when heated, I anticipated that all its precipitable matter would be thrown down at a low temperature, and I applied a freezing mixture, keeping the oil at zero for some hours. No such change, however, took place.

The plan which I ultimately decided upon as the best which I had arrived at, was to shake up the oil with a little hot water, and to leave the water in the bottle; a mucilaginous preparation forms on the top of the water, and acquires a certain tenacity, so that the oil may be poured off to nearly the last, without disturbing the deposit. Perhaps cold water would answer equally well, were it carefully agitated with the oil and allowed some time to settle. A consideration of its origin and constitution, indeed, strengthens this opinion; for although lemon otto is obtained both by distillation and expression, that which is usually found in commerce is prepared by removing the 'flavedo' of lemons with a rasp, and afterwards expressing it in a hair sack, allowing the filtrate to stand, that it may deposit some of its impurities, decanting and filtering. Thus obtained, it still contains a certain amount of mucilaginous matter, which undergoes spontaneous decomposition, and thus (acting, in short, as a ferment) accelerates a similar change in the oil itself. If this view of its decomposition be a correct one, we evidently, in removing this matter by means of the water, get rid of a great source of alteration, and attain the same result as we should by distillation, without its waste or deterioration in flavour.

I am, however, aware that some consider the deposit to be modified resin. Some curious experiments of Saussure have shown that volatile oils absorb oxygen immediately they have been drawn from the plant, and are partially converted into a resin, which remains dissolved in the remainder of the essence.

He remarked that this property of absorbing oxygen gradually increases until a maximum is attained, and again diminishes after a certain lapse of time. In the oil of lavender this maximum remained only seven days, during each of which it absorbed seven times its volume of oxygen. In the oil of lemons the maximum was not attained until at the end of a month; it then lasted twenty-six days, during each of which it absorbed twice its volume of oxygen. It is the resin formed by the absorption of oxygen, and remaining dissolved in the essence, which destroys its original odour. In conclusion, I would recommend that this oil, as well as all other essential oils, be kept in a cool, dark place, where no very great changes of temperature occur.

When new and good, lemon otto may be freely used in combination with rosemary, cloves, and caraway, for perfuming powders for the nursery. From its rapid oxidation it should not be used for perfuming grease, as it assists rather than otherwise all fats to turn rancid; hence pomatums so per-

fumed will not keep well. In the manufacture of other compound perfumes, it should be dissolved in spirit, in the proportion of six to eight ounces of oil to one gallon of spirit. There is a large consumption of otto of lemons in the manufacture of eau de Cologne; that Farina uses it is easily discovered by adding a few drops of Liq. Ammoniæ fort. to half an ounce of his eau de Cologne, the smell of the lemon is thereby brought out in a remarkable manner.

Perhaps it is not out of place here to remark that in attempts to discover the composition of certain perfumes we are greatly assisted by the use of strong Liq. Ammoniæ. Certain of the essential oils combining with the ammonia allow those which do not do so, if present in the compound, to be smelt.

LEMON GRASS.—According to Thwaites, the otto in the market under this name is derived from the *Andropogon citratus*, a species of grass which grows abundantly in India. It is cultivated to a large extent in Ceylon and in the Moluccas purposely for the otto, which from the plant is easily procured by distillation. Lemon grass otto, or, as it is sometimes called, oil of verbena, on account of its similarity of odour to that favourite plant, is imported into this country in old English porter and stout bottles.



LEMON GRASS AND SECTION.

It is very powerful, and well adapted for perfuming soaps and greases; but its principal consumption is in the manufacture of artificial essence of verbena. From its comparatively low price, great strength, and fine perfume (when diluted), the lemon grass otto may be much more used than at present with considerable advantage to the retail shopkeeper.

The annual production of lemon grass otto in Ceylon is nearly 1,500 lbs., and it is valued there at 1*s.* 4*d.* per ounce. Specimens of the plant which produces it are to be seen at the Royal Gardens, Kew.

The schœnanthus of the laboratory is the flowering rush or Σχοῖνος ἀροματικός of Dioscorides. It grows in Africa, and especially in the Arabian deserts. Lemery states that it is so abundant in the district of Mount Lebanon that the people use it for the litter of camels, whence its designation,—*Fœnum* or *Stramen camelorum.* Royle says that it greatly resembles a plant which comes from India, from which a volatile oil is extracted named *grass oil of Namur.*

LEMON-SCENTED GUM TREE, *Eucalyptus Citriodora.*—The leaves of this species of *Eucalyptus*, on being bruised, yield a delightful citron-like odour, compared by some to the smell of balm, and by others to that of citronella; and when the leaves are dried and placed among clothes or papers, they impart an agreeable scent to them. Considering that it might prove useful in an economical point of view, Dr. Bennett, author of 'Gatherings of a Naturalist in Australia,' procured a quantity of the leaves, which were distilled by Mr. Norie, a practical chemist in Sydney, and it was found that three pounds twelve ounces of leaves yielded by distillation six drachms and a half of a pure, colourless otto; a specimen of which Dr. Bennett has placed in the Museum at Kew.

LIGNALOE. (See LINALOE.)

LILAC.—The fragrance of the flowers of this ornamental shrub is well known. The essence of lilac is obtained either

by the process of maceration, or enfleurage with grease, and afterwards treating the pomatum thus formed with rectified spirit, in the same manner as previously described for cassie; the odour so much resembles tubereuse, as to be frequently used to adulterate the latter, the demand for tubereuse being at all times greater than the supply. An agreeable

Imitation of Essence of White Lilac

may be compounded thus: --

Spirituous extract from tubereuse pomade . . .	1 pint
„ „ of orange flower pomade . . .	½ pint
Otto of almonds	3 drops
Extract of civet	½ oz.

The civet is only used to give permanence to the perfume of the handkerchief.

LILY.—The manufacturing perfumer rejects the advice of the inspired writer, to 'consider the lilies of the field.' Rich as they are in odour, they are not cultivated for their perfume. If lilies are thrown into oil of sweet almonds, or olive oil, they impart to it their sweet smell; but to obtain anything like fragrance, the infusion must be repeated a dozen times with the same oil, using fresh flowers for each infusion, after standing a day or so. The oil being shaken with an equal quantity of spirit for a week, gives up its odour to the alcohol, and thus extract of lilies *may* be made. But how it *is* made is thus:—

Imitation Lily of the Valley.

Extract of tubereuse	1 pint
„ jasmine	1 oz.
„ fleur d'orange	2 oz.
„ vanilla	3 oz.
„ cassie	½ pint
„ rose	½ pint
Otto of almonds	3 drops

Keep this mixture together for a month, and then bottle it for sale. It is a perfume that is very much admired.

LIME.—Among one of the Leeward Caribbees is Montserrat, a little island on which *Citrus Limetta* grows most prolifically, and in almost an indigenous manner. Under the care of Mr. Joseph Sturge, the Montserrat Company, of which Mr. Sturge is director, annually produce no less than 1,000 lbs. of the true otto of citron, all by means of the Ecuelle process, and it is so pure that it is worth twice its present price in the market; but the products of Sicily, which are by no means good, compete with it to its disadvantage. Mr. Sturge states that 'his citron orchards consist of about 500 acres, and that each acre contains about 200 trees. It takes seven years from the seed for them to come into full bearing; they flower more or less whenever they get heavy rain, and the fruit ripens in about four months after the flowers appear.' He therefore gets fruit all the year round, but the chief harvest is from September to January.

L'Ecuelle.—This valuable instrument, which is used for extracting the odorous principles from the fruit of the orange



THE ECUELLE.

and citron family, may be modified in size and form; it is sometimes shaped as a drum, the fruit being put inside; the drum is made to rotate by mechanical gearing. (See LEMON.)

LIME-TREE BLOSSOM.—Is there a Wickhamite that does not remember the delightful scent of the flowers of the fine old lime trees around Winchester Cathedral?

> There I stood beneath the flowering limes,
> Whose golden blossoms waved above my head
> A fragrant orchestra!

There is a fine avenue of lime trees on the approach to Chiswick House, near to my own residence, Hughenden House; here I have often had opportunities of studying the fragrance of their blossoms. I make a perfume which is a good imitation of

Lime-Tree Blossom.

Spirit, 60 over-proof	2 pints
Otto lignaloe	1 oz.
Rose triple, jasmin, and orris, of each	½ pint

LINALOE, also improperly called LIGNALOE. — The Victorian era has been marked not only by the penny post and shilling telegraph, by the discovery of gold in Australia and diamonds at the Cape, but also by the introduction of a veritably new perfume—linaloe. The otto of this plant was first shown to me about 1865, but under the name linaloe. I was then unable to find its origin, and the importers, Messrs. Sargant and Son, were unwilling to give any information respecting it. This at first caused doubts as to its being a genuine production.

My Hyper-Osmia, however, confirmed me that I had a new otto under my nose; and thus convinced, by smell alone, I have secured it a place in the laboratory.

Not being able to find linaloe in any English botanical works, I had almost given up the solution of Messrs. Sargants' secret, when I came across the word lignaloe, by hearing it read one morning at church from the lessons of the day, Numbers xxiv. 6. Here, said I, is the revelation of the long sought

for linaloe ; it must be lignaloe. Now I had no difficulty in learning all about this plant from the usual sources, and I at once set to work to 'introduce' it to the perfumery world, as I then firmly believed it to be the 'lignaloe of the scriptures.' One or two friends well versed in botany informed me that the *Aquilaria Agallocha*, the true lignaloe of the Bible, was a tree of south-eastern Asia, and did not exist in the American continent. Now I had learned from Messrs. Sargant that the article veritably came from Mexico! It was clear, then, that if the botanists were correct, I could not be dealing with the true lignaloe. Samples of the wood were procured from Vera Cruz, and, being submitted to the authorities at Kew Gardens, were quickly pronounced to be the *Bois de Citron du Mexique*, so named by Guibourt, but which in Mexico is known under the name of 'linaloe.' By the distillation of a hundred pounds of the broken-up wood I procured several ounces of otto of precisely the same smell and character as that which was imported.[1] The otto of linaloe is perfectly white in colour ; it appears to be very unalterable by the action of air (oxygen) ; and it is here it differs so much from any of the citron group of odours, but to which it nevertheless belongs by fragrance, having a scent which in the gamut would be



It so much resembles the sweet odour of the lime-tree flowers that, when properly diluted with spirit and with the addition of a little rose, it makes an excellent imitation perfume of lime blossoms (for which see p. 151). When otto of linaloe is combined with soap, it loses odour rapidly, showing some action by alkalies. It scents oil and grease very nicely. The ground wood makes a good sachet. The following is the

[1] A good account of the linaloe has been published in the *Pharmaceutical Journal*, by Mr. James Collins.

recipe of the now well-known handkerchief perfume as introduced by the house of Piesse and Lubin :—

Essence of Lignaloe.

Tinctures of orris and vanilla, of each	1 pint
Esprit jasmin, and tubereuse „	2 pints
Rose triple	2 pints
Spirit 60 over-proof	4 pints
Otto lignaloe	3 oz.

MACE.—This substance is procured from the nutmeg-tree (*Myristica moschata et tomentosa*): thus, the nutmegs are enclosed in four different covers; the first is a thick husk, something like that of our walnuts, but larger; under this lies a thin reddish coat, which is the mace of commerce; the mace wraps up the shell and opens like a network, as the fruit, or rather seed, grows; the shell is hard and thin and destitute of odour; under this is a greenish film, of no use in trade, but which is, in truth, the shirt of the seed or nutmeg. The odour of mace only resembles that of nutmeg in being spicy; it cannot, however, be mistaken for the smell of nutmeg. The otto of mace, like that of nutmeg, is readily procured by distillation. The nutmeg tree, like that of orange, gives distinct fragrances in different parts of it. Thus we have otto of mace and otto of nutmeg produced by the same plant within a quarter of an inch of each other. What wonderful valves and taps to keep them from mixing! Ground mace is used in the manufactnre of some of those scented powders called sachets. The strong-smelling essential oil is useful for scenting soap.

MAGNOLIA.—The perfume of this flower is superb; practically, however, it is of little use to the manufacturer; the large size of the blossoms and their comparative scarcity prevent their being used; but a very excellent imitation of their odour is made as under, and is that which is found in the perfumers' shops of London and Paris :—

Imitation Essence of Magnolia.

Spirituous extract of orange-flower pomatum . . .	1 pint
„ rose pomatum	2 pints
„ tubereuse pomatum . . .	½ pint
„ violet pomatum	½ pint
Otto of citron zeste	3 drs.
„ almonds	10 drops

MARJORAM.—The otto procured by distilling *Origanum majorana*, commonly called oil of origan by the French, is exceedingly powerful, and in this respect resembles all the ottos from the different species of thyme, of which the marjoram is one. One hundredweight of the dry herb yields about ten ounces of the otto. Origan oil is extensively used for perfuming soap, but more in France than in England. It is the chief ingredient used by Gellé Frères, of Paris, for scenting their 'Tablet Monstre Soap,' so common in the London shops.

MEADOW-SWEET, known also as MEADOW-QUEEN.—A sweet-smelling otto can be produced by distilling the *Spiræa ulmaria*, but it is not used by perfumers; it is, however, interesting as being one of those organic substances which can be made in the chemical laboratory.

MECCA BALM. (See BALSAM.)

MELISSA. (See BALM.)

MIGNONETTE, otherwise RÉSÉDA.—But for the exquisite odour of this little flower, it would scarcely be known otherwise than as a weed. Sweet as it is in its natural state, and prolific in odour, we are not able to maintain its characteristic smell as an essence. Like many others, during separation from the plant, the fragrance is more or less modified; though not perfect, it still reminds the sense of the odour of the flowers. To give it that sweetness which it appears to want, a certain quantity of violet is added to bring it up to the market odour.

As this plant is so very prolific in odour, we think some-

thing might be done with it in England, especially as it flourishes as well in this country as in France. We desire to see Flower Farms and organised Perfumatories established in the British Isles, for the extraction of essences and the manufacture of pomade and oils, of such flowers as are indigenous, or that thrive in the open fields of our country. Besides opening up a new field of enterprise and good investment for capital, it would give healthy employment to many women and children. Open air employment for the young is of no little consideration to maintain the stamina of the future generation ; for it cannot be denied that our factory system and confined cities are prejudicial to the physical condition of the human family.

To return from our digression. The essence of mignonette, or, as it is more often sold under the name of, Extrait de Réséda, is prepared by infusing the réséda pomade in rectified spirit, in the proportion of one pound of pomade to one pint of spirit, allowing them to digest together for a fortnight, when the essence is filtered off the pomade. One ounce of extract of tolu is added to every pint. This is done to give permanence to the odour upon the handkerchief, and does not in any way alter its smell. M. March, of Nice, is the principal maker of Réséda pomade ; to use his own words, he has a *spécialité* for its fabrication. It is made by the enfleurage process. By Millon's process an extract of mignonette is obtained, which has the full odour of the flowers.

MIRIBANE.—The French name for artificial essence of almond. (See ALMOND.)

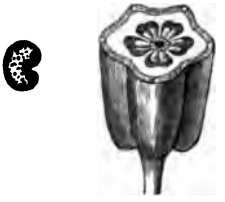
MINT.—All the *Menthidæ* yield fragrant ottos by distillation. The otto of the spear-mint (*M. viridis*) is exceedingly powerful, and very valuable for perfuming soap, in conjunction with other perfumes. Perfumers use the ottos of the mint in the manufacture of mouth washes and dental liquids. The leading ingredient in the celebrated 'eau Botot' is oil of peppermint in alcohol. Mint ottos have more

power than any other aromatic to overcome the smell of tobacco. Mouth washes, it must be remembered, are as much used for rinsing the mouth after smoking as for a dentifrice. (See PEPPERMINT.)

MUSK-SEED.—This odorous substance, known in the perfumery trade as *Grains d'Ambrette*, is produced by the plant *Hibiscus Abelmoschus*. *Kabb-el-Misk* is the Arabic name, of which, says Burnett, Abelmoschus is a vile corruption. The



HIBISCUS.



MUSK SEED. TRANSVERSE SECTION OF THE MUSK SEED.

plant is cultivated in Martinique, whence this seed is exported. Very little is known in England of Chinese toilet practices; but we are told, on good authority, that from one of these species, the *Hibiscus Rosa sinensis*, 'the Chinese make a black dye for their hair and eye-brows, and a blacking for their shoes!' Musk seed, when ground, certainly reminds our smelling sense of the odour of musk, but it is poor stuff at best; however, for making cheap sachet powder, it may be used for variety's sake. When hair powder was in

fashion, perfumers used to scent the starch of which the powder was made, by mixing the ground ambrette with the fecula; after lying together for a few hours, the starch was then sifted away, and packed for sale. Musk seed is a native of India, but the plant which produces it has been acclimatised in Egypt and the Antilles. The most valued comes from Martinique.

MYRTLE.

> The laurel and the myrtle sweets agree,
> And both in nosegays shall be bound for thee.—HORACE.

A very fragrant otto may be procured by distilling the leaves of the common myrtle; one hundredweight will yield about five ounces of the volatile oil. The demand for essence of myrtle being very limited, the odour as found in the perfumers' shops is very rarely a genuine article, but is imitated thus:—

Imitation Essence of Myrtle.

Extract of vanilla		½ pint
„ roses		1 pint
„ fleur d'orange		½ pint
„ tubereuse		½ pint
„ jasmine		2 oz.

Mix, and allow to stand for a fortnight: it is then fit for bottling, and is a perfume that gives a great deal of satisfaction.

Myrtle-flower water is sold in France under the name of eau d'ange, and may be prepared like rose, elder, or other flower waters.

The plant most commonly used is the *Myrtus communis*, of the family of myrtaceæ.

MYRRH.—This odorous gum or resin has been known from time immemorial, as is evident from its frequent mention in the Bible. Its fragrance is due to a peculiar otto or essential oils. One hundred pounds yield by distillation

about eight ounces of the otto, which has all the characteristics of myrrh in a high degree. Considering such a substance to possess interest, I have placed a sample of the otto of myrrh in the Museum at Kew.

Major Harris describes the myrrh tree (*Balsamodendron Myrrha*) as growing abundantly on the Abyssinian coast of the Red Sea to the Straits of Bab-el-Mandeb, over all the barren hill-sides of the low zone inhabited by the Danakil or Adaril tribes. It is called Kurbeta, and there exist two varieties; one (producing the better description of the gum) being a dwarf shrub with deeply serrated crisp leaves of a dull green; while the other, which yields a substance more like balm than myrrh, attains a height of ten feet, and has bright shining slightly dentated leaves. The myrrh called Hofali flows freely from any wound, in the form of a milky juice, possessing a perceptible acridity, which either evaporates or becomes chemically changed during the formation of the gum. The seasons for collecting it are in January, when the buds appear after the first rain, and in March, when the seeds are ripe.

Every passer-by transfers such portions of it as he may find to the hollow boss of his shield, and exchanges it for a handful of tobacco with the next slave-dealer whom he meets on the caravan route. The merchants also of the sea-coast, before returning from Abyssinia, send into the forests that gird the western bank of the river Hawash, and bring away considerable quantities af the *Hofali*, which is sold at a high price.

The natives administer it to their horses, in cases of fatigue and exhaustion.[1]

Gum myrrh is used extensively by perfumers, in the manufacture of dentifrices, in pastils, and fumigating spirits.

Myrrh is prescribed in the Mosaic law[2] as one of the

[1] *Trans. Linn. Soc.* [2] Ex. xxx. 23.

exquisite substances of which the holy oil was to be compounded. The Greeks named it *Myrrha* or *Smyrna*, fancying that it was produced by the tears of the mother of Adonis, after the gods in compassion had changed her into a tree, to rescue her from the wrath of her father Cinyras.

Brandes states that good myrrh contains 2.60 per cent. of a volatile oil, 22.24 of soft resin, and 5.56 of dry resin. It also contains 55 per cent. of gum. It is therefore a gum resin.

NARCISSUS.—This plant is cultivated to a small extent at Nice, and its odour is procured by enfleurage and maceration. The smell of it to many is exceedingly grateful, but in close apartments the exhalations of the plant are said to be noxious; indeed, its narcotic odour was known to the ancients, and hence its name is said to be derived from *ναρκή*, stupor. The following is a good form, imitating the odour of narcissus when the true extract cannot be obtained :—

Extract of Narcissus.

Extract of tubereuse	3 pints
„ jonquil	2 pints
„ storax	½ pint
„ tolu	½ pint

NEROLI, or ORANGE-FLOWER.—The ORANGE is cultivated from seed or pips; at the third year they are grafted, either with the sweet Portugal or bitter Bigaradier; at the fifth year they should be planted into their final resting-place.

Before planting the orange, a tree which attains great age, the soil upon which it is to live must be well prepared, otherwise the after life of the tree will not be of that thriving condition which we could desire. The soil should be trenched at least four feet deep and well manured, and the care bestowed upon the infant plant will be seen fifty years, nay, even a century afterwards. A tree requires fifteen years to reach maturity, but will produce both flowers and fruit in

four or five years. When in full vigour, each tree yields an average of twenty-five pounds' weight of blossoms annually. Many plantations of orange-trees at Nice are more than one hundred years old. At Fontainebleau there are now to be seen orange-trees planted by an ancestor of mine two hundred years ago. There is a public market for orange-blossoms during the season at Nice: the bitter orange-flowers fetch 3*f.* per kilogramme, the sweet about 2*f.*



ORANGE.

The market season for orange-flowers at Nice lasts for more than a month, as an average, and during that time there are sold about fifteen to eighteen tons of flowers daily!!! and a ton of flowers will yield more than a kilogramme of otto, say forty ounces, worth 20*l.* sterling; and the residuary water, highly saturated with odour, is worth another 10*l.* note.

Two distinct odours are procurable from the orange-blossom, varying according to the methods adopted for procuring them. This difference of perfume from the same

flower is a great advantage to the perfumery factor, and it is a curious fact worthy of inquiry by the chemical philosopher. This duality of fragrance is not peculiar to the orange-flower, but applies to many others, especially rose—probably to all flowers.

When orange-flowers are treated by the maceration process—that is, by infusion in a fatty body—we procure orange-flower pomatum, its strength and quality being regulated by the number of infusions of the flower made in the same grease. It requires eight kilogrammes of blossoms to enflower one kilogramme of grease, divided over thirty-two infusions—that is, a quarter kilogramme of flowers to every kilogramme of fat for each maceration.

By digesting this orange-flower pomatum in rectified spirits, in the proportions of from six pounds to eight pounds of pomade to a gallon of spirit for about a month at a summer heat, we obtain the extrait de fleur d'orange, or extract of orange-flowers, a handkerchief perfume surpassed by none. In this state its odour resembles the original so much, that with closed eyes the best judge could not distinguish the scent of the extract from that of the flower. The peculiar flowery odour of this extract renders it valuable to the perfumers, not only to sell in a pure state, but, slightly modified with other *extraits*, passes for 'sweet pea,' 'magnolia,' &c., which it slightly resembles in fragrance.

Now, when orange-flowers are distilled with water, we procure the otto of the blossom, which is known commercially as oil of neroli. The neroli procured from the flowers of the *Citrus Aurantium* is considered to be the finest quality, and is called 'neroli petale,' or neroli douce, *i.e.* sweet neroli. The next quality, 'neroli bigarade,' or bitter neroli, is derived from the blossoms of the *Citrus Bigaradia*, or Seville orange. Another quality, which is considered inferior to the preceding, is the 'neroli petit grain,' obtained

by distilling the leaves and the young unripe fruit of the different species of the citrus. If a leaf of the orange-tree be held up between the observer and the sun, he will perceive small globular specks in the leaf, which are in truth the sacs of otto; from this fact the term petit grain—piccolo—is derived.

The 'petale' and 'bigarade' neroli are used to an enormous extent in the manufacture of Hungary water and eau de Cologne, and other handkerchief perfumes. The 'petit grain' is mainly consumed for scenting soap. There are several varieties of petit grain otto; thus petit grain douce is procured by distillation from the leaf of the eating or sweet orange tree. Petit grain limon is in like manner derived from the leaf of the common lemon tree.

Petit grain bigarade is won from the leaf of the Seville or bitter orange; other varieties occur as numerous, as are the Auran and Citrus. Dr. J. E. De Vrij, while at Bandong in Java, made a very good neroli from the flowers of the shaddoc tree, *Citrus decumana*. To form the

Esprit Neroli.

Neroli petale	4 oz.
Rectified spirit	1 gallon

Although very agreeable, and extensively used in the manufacture of bouquets, it has no relation to the flowery odour of the extrait de fleur d'orange, as derived from the same flowers by maceration; in fact, it has as different an odour as though obtained from another plant, yet in theory both these extraits are but alcoholic solutions of the otto of the same flower.

The water used for distillation in procuring the neroli, when well freed from the oil, is imported into this country under the name of eau de fleur d'orange, and may be used, like elder-flower and rose-water, for the skin, and as an eye

lotion. It is remarkable for its fine fragrance, and it is astonishing that it is not more used, being moderate in price. There are three sorts of orange-flower waters found in commerce. The first is distilled from the flowers; the second is made with distilled water and neroli; and the third is distilled from the leaves, the stems, and the young unripe fruit of the orange-tree. The first may be easily distinguished by the addition of a few drops of sulphuric acid to some of the water in a tube; a fine rose colour is almost immediately produced. The second also gives the same colour when it is freshly prepared; but after a certain time—two or three months at the farthest—this colour is no longer produced, and the aroma disappears completely. The third is not discoloured by the addition of the sulphuric acid; it has scarcely any odour, and that rather an odour of the lemon plant than of orange-flowers. Hitherto England has been dependent on Italy and the South of France for the various odours derived from the orange; but from the extensive cultivation of this plant at THE ORANGERY, near Sydney, by Richard Hill, Esq., J. P., we may soon expect in the markets of Britain the products of this plant from our antipodean colony.

As there are full a dozen or more well-known varieties of the orange, there may be procured a corresponding quantity of varieties of otto from them.

The origin of the term 'Neroli,' applied to the otto of orange-blossom, is not very definite. It may have been named after the celebrated Roman Emperor Nero, who was so fond of scents that he caused the roofs of his dining halls to represent the firmament, and to shower down, night and day, all sorts of perfumes and sweet waters; or it may be that 'Neroli' was first procured by the Sabines, who, to distinguish it from other perfumes of the period, named it neroli, from 'nero,' which signifies 'strong.' The Sabines, it should

be remembered, inhabited a province of Italy, Sabina, where the orange-tree is very abundant. (See ORANGE ZESTE.)

During the past century, the odour of orange-flowers was so much in vogue, that the cultivation of Louis XIV.'s orange-trees was a source of considerable expense, for the great king would have one of these favourite shrubs in each of his apartments.

NUTMEG.—Few fragrant substances are of more commercial importance than the nutmeg (*Myristica moschata*). 'Its history,' says Burnett, 'affords an instance of the extravagance to which the spirit of monopoly will urge and has carried not only private individuals but even States.'

The principal nutmeg-gardens of the world are the Banda Islands, colonised by the Dutch about two hundred and fifty years ago. Soon after the subjugation of the original inhabitants, they endeavoured to secure to themselves the entire trade in this odorous substance. For this purpose they encouraged the cultivation of the nutmeg-tree in only a few of the islands; and being over-anxious, for the sake of the monopoly, to have them there exclusively under their own command, they destroyed the trees in the neighbouring isles.

It will be remembered that they pursued the same policy with respect to the clove-plant. More than once they have, however, suffered dearly for their insatiable avarice: for the dreadful hurricanes and earthquakes, which swept harmlessly over the other islands, nearly annihilated the nutmeg-trees of Banda in 1778. While the Dutch held the Spice Islands the quantity of nutmegs and mace exported from their nutmeg-grounds, circumscribed as they were, was truly enormous. The quantity sold in Europe has been estimated at 250,000 pounds, and in the East Indies at 125,000 pounds; of mace, the average has been 90,000 pounds sold in Europe, and 10,000 in India.

When the Spice Islands were taken by the British, in 1796, the importation by the East India Company into

England alone, in two years following the capture, were, of nutmegs 129,723 pounds, and of mace 286,000 pounds. It is thus evident that Britannia does not 'turn up her nose' at the odour of nutmeg and mace.

When the crops of spice have been superabundant, and the price, in consequence, likely to be reduced, the same ignorant spirit before mentioned has actuated the Dutch to destroy immense quantities of the fruit rather than suffer the market price to be lowered. When Sir William Temple was at Amsterdam a merchant who had returned from Banda assured him that 'at one time he saw three piles of nutmegs



NUTMEG WITH MACE UPON IT.

burnt, each of which was more than a church of ordinary dimensions could hold.' Mr. Wilcocks, the translator of 'Stavarinus's Travels,' relates that he beheld such a conflagration of cloves, nutmegs, and cinnamon upon the island of Newland, near Middleburgh, in Zealand, as perfumed the air with their peculiar fragrance for many miles round. Balfour says that 'in 1814, when the Moluccas were in the possession of the English, the number of nutmeg-trees planted out was estimated at 570,500, of which 480,000 were in bearing. The produce of nutmegs in the Moluccas has been reckoned at from 600,000 to 700,000 pounds per annum—of which

half goes to Europe—and about one-fourth that quantity of mace. The annual consumption of nutmegs in Britain is said to be 140,000 pounds. The nutmeg-tree, like many others, yields two distinct odórous substances; that is, otto of mace (see MACE), and otto of nutmeg. The otto of nutmeg, of which we have here to speak, is a beautiful white and transparent fluid, having an intense fragrance of the nut, from which it is easily procured by distillation. It enters



NUTMEG.

into the composition of numerous perfumery preparations, of which the Frangipanni series are examples. As it is more powerful than cloves it must be used sparingly; but, when used with judgment, combines happily with lavender, santal, bergamot, and others.

By expression the nutmeg will also yield an unctuous fat-oil of an agreeable odour; this combined with an alkali produces a pleasant soap. Forty years ago such soap was commonly sold by perfumers under the name of Bandana or Banda soap, but which is now quite out of date.

The pleasant odour of the nutmeg is familiar to all. The ground nuts are used advantageously in the combinations of scented powders used for scent-bags. (See SACHET POWDER.)

According to Cloëz the otto of nutmeg can be obtained by distillation in contact with water, or sulphuret of carbon and distillation. The crude oil is a complex product, whose boiling-point is about 168°, and this temperature is maintained for some time before its rises to 210°. The rectified essence is liquid and colourless, and does not solidify at −18°. It boils at 165°; turns the plane of polarisation of luminous rays to the left; has a rotatory force equal to −13.5°; and may be represented by $C^{20}H^{16}$ (four volumes).

The concrete oil of nutmeg, obtained by expression (butter of nutmeg), is prepared in the countries which produce it; that is to say, the Moluccas, Banda, and Cayenne. It is offered in the shape of oblong cakes, wrapped in palm-leaves, solid, oily, friable, of a pale yellow colour, or yellow marbled with red, and having a strong smell of nutmeg. Sometimes it happens that the essence has been withdrawn by distillation, or that some fatty inodorous bodies have been mixed with it.

OLIBANUM is a gum resin, used to a limited extent in this country in the manufacture of incense and pastilles. It is chiefly interesting as being one of those odoriferous bodies of which frequent mention is made in the Holy Volume.

'It is believed,' says Burnett, 'to have been one of the ingredients in the sweet incense of the Jews; and it is still burnt as incense in the Greek and Romish churches, where the diffusion of such odours round the altar forms a part of the prescribed religious service.' Mr. P. L. Simmonds says:—

The gum olibanum of commerce is the frankincense of the ancients and the luban of the Arabs. In India it is obtained from several species of *Boswellia, serrata, thurifera,* and *glabra.* No botanical description

appears to have been published of the African tree, although Captain Kempthorne, Major Harris, and other travellers furnished some general account of it. The tree invariably grows from the bare and smooth sides of the white marble rocks, or from isolated blocks of the same, scattered over the plain, without any soil whatever. On making a deep incision into the trunk the resin exudes profusely, of the colour and consistence of milk, but hardening into a mass by exposure to the air. The young trees produce the best and most valuable gum, the older merely yielding a clear glutinous fluid resembling copal, and exhaling a strong resinous odour.

Olibanum was formerly in high repute as a sovereign remedy against inflammation of the eyes, and as an efficacious remedy in consumption. It was also commonly drank as a stimulant in wine. But for all these purposes it has long gone out of use, and is chiefly imported here for re-shipment to the Continent, being bought up by the Greek merchants for the use of the Church.

The trees that produce the luban or frankincense are of two kinds, viz. the luban meyeti and the luban bedowi. Of these the meyeti, which grows out of the naked rock, is the more valuable; and when clean-picked and of good quality it is sold by the merchants on the coast for 1¼ dollar per frasila of 20 lbs. The luban bedowi of the best quality is sold for 1 dollar per frasila. Of both kinds the palest colour is preferred. The trees vary greatly in height, but are never above twenty feet, with a stem of nine inches in diameter. Their form is very graceful, and when springing from a mass of marble on the brink of a precipice their appearance is especially picturesque.

Although the Wursungili range and other mountainous tracts afford an inexhaustible supply of frankincense, it is a mistake to suppose that elevated districts produce the best gum.

Lieutenant Cruttenden, in his journey among the Edoor tribes, states that the gum of the large-leaf kind of frankincense tree is not much prized.

Olibanum is partially soluble in alcohol, and, like most of the balsams, probably owes its perfume to a peculiar odoriferous body, associated with the benzoic acid it contains.

For making the tincture or extract of olibanum take one pound of the gum to one gallon of the spirit.

Two species of olibanum or frankincense are recognised, one of Indian and the other of African origin. The gum contains, according to Braconnot, a small quantity of volatile

oil, a resin soluble in spirit, a gum soluble in water, and a resin insoluble in either water or alcohol.

OPOPANAX.

Sweet issue of a more sweet-smelling sire.—BARD OF AVON.

The plant which produces the gum resin of this name is the *Opopanax Chironium* of the botanists, found plentifully growing wild in Sicily. The resin itself has been described in drug-books from the time of Dioscorides; but the mode of collecting it, the quantity produced, &c., I have been unable to discover. Pelletier made an analysis of it, showing it to contain about 3 per cent. of otto of a very remarkably strong and aromatic odour, much abused by some as being nauseous, and praised by others for its fragrance. It is the same with patchouly and musk: they have their friends and enemies, but the latter cannot prevent their use. When opopanax was first introduced as a perfume it was very generally abused by those who had not smelled it, but said it was nasty because they read it was so described in a Bloomsbury journal. No perfume ever made, eau de Cologne excepted, has ever had a larger sale.

ORANGE ZESTE, or PORTUGAL.—Under the title Neroli we have already spoken of the odoriferous principle of the orange-blossom. We have now to speak of what is known in the market as essence of orange, or, as it is more frequently termed, essence of Portugal, derived from the rind of the fruit of the sweet orange.

The otto of the orange fruit or peel is procured mostly in December and January, by rubbing the oranges in a metal cup covered with spikes, known as an Ecuelle. This causes otto of very pure quality to flow from the otto-glands. The fruit, after the otto is obtained, is cut up and mixed with bran, and given to cows for food. Cows fed thus yield very fine milk. A second quality of essence of orange-peel, or

Portugal, is obtained by rasping the peel or flavedo and then submitting it to pressure. A third and commonest kind is procured by distilling any of the refuse of former operations.

The abundance of otto in the peel is shown by pinching a piece near the flame of a candle; the otto that spurts out ignites with a brilliant illumination.

It has many uses in perfumery, and from its refreshing fragrance finds numerous admirers.

It is the leading ingredient in what is sold as 'Lisbon water' and 'eau de Portugal.' The following is a very useful form for preparing

Lisbon Water.

Rectified spirit (not less than 60 over-proof)	1 gallon
Otto of orange-peel	4 oz.
„ citron zeste	2 oz.
„ rose	½ oz.

This is a form for

Eau de Portugal.

Rectified spirit (60 over-proof)	1 gallon
Essential oil of orange-peel	8 oz.
„ of citron zeste	2 oz.
„ of bergamot	1 oz.
„ of otto of rose	¼ oz.

Grape-spirit for this article produces the finest quality.

It should be noted that these perfumes are never to be put into wet bottles, for if in any way damp from water a minute portion of the ottos is separated, which gives an opalescent appearance to the mixture. Indeed, all bottles should be *spirit-rinsed* prior to being filled with any perfume, but especially with those containing essences of orange or lemon peel.

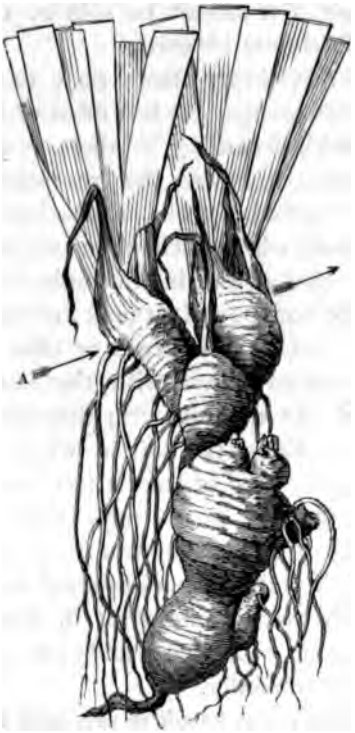
No tree is so profitable to the flower-farmer as the orange, and emigrants to any of our warm colonies should make a

note of this, and fix on their memory that the leaves of orange yield an otto worth 3*s.* an ounce; that the flowers yield an otto worth 10*s.* an ounce; that the blossom also yields, by inflowering, a fat worth 8*s.* per pound; that the rind of the fruit yields an otto worth 12*s.* to 16*s.* per pound; and that the fruit, if it cannot be sold by the score in the market, is a relished food for cattle.

Of all the scent-yielding plants none has a value at all equal to that of the orange. It is a mine of perfume in itself. The blossoms yield, according to their mode of treatment, two distinct odours, one having the true scent of the flower, the other a scent called Neroli. Orange-peel, too, furnishes a delightful perfume, with which all of us are familiar; and lastly the leaves give a scent inferior only to the true neroli. Here then we have from one plant no fewer than four perfumes. Orange stocks are raised from seeds or pips, and in the third year they are grafted either with the sweet Portugal or bitter Bigaradier. In the fifth year they should be planted where they are to stand; the soil in which they are to be placed should be trenched at least 4 feet deep and well manured, inasmuch as fifty years, nay, even a century afterwards, the results of good early treatment will be apparent. Orange-trees require fifteen years to reach maturity, but they will produce both flowers and fruit in four or five years. When in full vigour each tree yields on an average 25 lbs. weight of blossoms annually.

The otto of the orange fruit is procured from the peel by what is called the ecuelle process. The ecuelle is a tinned copper bowl, furnished with concentric rows of short spikes or teeth, and a hollow handle, with a gutter from it to the edge of the bowl, through which liquid from the hollow handle can be poured. In order to obtain the otto the fruit is rolled by hand over and over the spikes, thus breaking the peel in such a manner that the otto spurts out into the ecuelle, and finds

its way into the hollow handle, which, when full, is emptied into another vessel. An inferior quality of otto is procured by rasping and slicing the peel, and then pressing out the juice; and this, and the better process just described, are those by which the fruits of all citronworts are divested of



ORRIS ROOT.

their scent-yielding properties—operations which are put into practice to a great extent at Messina, in Sicily. (See NEROLI.)

ORRIS, properly IRIS.—The dried rhizome of *Iris florentina* has a very pleasant odour, which, for the want of a better comparison, is said to resemble the smell of violets; it is,

however, exceedingly derogatory to the charming aroma of that modest flower when such invidious comparisons are made. Nevertheless, the perfume of iris root is good, and well worthy of the place it has obtained as a perfuming substance.

For commercial purposes this plant is extensively cultivated at Pontassieve, in Toscana. M. Michele Grazzini, who is one of the largest growers there, kindly supplies the following information as to its cultivation :—

'The harvest of the root takes place every three years ; the plants are dug up early in the spring-time, before they move for the next year's growth ; the flags are cut back, as shown in the illustration ; each root is then decapitated at a point indicated by the arrow at A ; the head is then replanted, and grows with great vigour, making in the course of the three years numerous offshoots and fresh roots. It flourishes best in a soil that is somewhat marshy and stony—in fact, a poor soil—and requires no manure ; it is of a larger growth than the common blue flag of the English gardens, the flowers far less numerous, and of a very pale blue ; moreover, it does not come into blossom till five or six weeks later than its naturalised English ally.

'The roots are spread out to dry and ripen in the open air ; each root is then trimmed with a knife into the shape as found in the market ; it is also at the same time sorted into the various qualities, some being bleached with fumes of burning sulphur. This operation is, however, detrimental to it for perfumery purposes. The bleached orris root, however, finds a sale, as there is a considerable manufacture of turned beads from it ; every peasant possesses a few hanks of orris beads, and there are also some exported to neighbouring countries : the chips and turnings from the orris bead manufacture at M. Grazzini's establishment amount to more than one ton in weight per annum ; they are very suitable to make tincture

of orris, for which purpose Messrs Piesse and Lubin have employed them, at the same time economising about 30*s.* per cwt. over the crushed orris ordinarily used.

'When distilled, orris root yields an otto smelling as the dried root; but I cannot say much in its favour.'

The powder of orris root is very extensively used in the manufacture of sachet powders, tooth powder, &c. It fathers that celebrated 'Oriental herb' known as 'odonto.' For tincture of orris, or, as the perfumers call it,

Extract of Orris.

Take orris root, crushed	7 lbs.
Rectified spirits	1 gallon

After standing together for about a month the extract is fit to take off. It requires considerable time to drain away; and, to prevent loss, the remainder of the orris should be distilled with water to recover the spirit. This extract enters into the composition of many of the most celebrated bouquets, such as 'Jockey Club' and others, but is never sold alone, because its odour, although grateful, is not sufficiently good to stand public opinion upon its own merits; but in combination its value is very great. Possessing comparatively little aroma itself, it has the power of strengthening the odour of other fragrant bodies; like the flint and steel, which, though comparatively incombustible, readily fire inflammable bodies.

PALM (*Elæis guineensis*).—The odour of palm oil—the fat-oil of commerce—is due to a fragrant principle which it contains. By infusion in alcohol the odoriferous body is dissolved, and resembles, to a certain extent, the tincture of orris, or of extract of violet, but is very indifferent, and is not likely to be brought into use, though several attempts have been made to render it of service when the cultivation of the violets has failed from bad seasons.

PATCHOULY (*Pogostemon Patchouli, Lindley; Plectranthus*

crassifolius, Burnett).—This is one of the most unique of scent-yielding plants. It is a labiate, stated by some authors to be a native of Silhet, a district of Bengal, some 120 miles from Decca ; it is now, however, known to grow in Java and Ceylon, and also on the Malay coast, and, one must say, in China, because its odour is very clearly defined in the black-stick ink, commonly called Indjan ink, which comes from that country. About the year 1850 patchouly began to be imported into England. Europe now obtains otto of patchouly from the fresh herb. Much is distilled by Mr. Scott, of Penang. It would pay growers to cultivate it in any of our



PATCHOULY.

warm colonies. Were the otto of it cheaper, the consumption could be increased tenfold. Growing plants of it can be seen in the Economic House, at Kew Gardens.

Having flowered in the conservatories of M. Vignat-Parelle, at Orleans, the plant was recognised by M. Pelletier as belonging to the family *Pogostemon.* It somewhat resembles our garden sage in its growth and form, but the leaves are not so fleshy.

The odour of patchouly is due to an otto contained in the leaves and stems, and is readily procured by distillation.

One hundredweight of good herb will yield about twenty-eight ounces of otto, which is of a dark brown colour, and of a density about the same as that of the otto of santal wood, which it resembles in its physical character. Its odour is the most powerful of any derived from the botanic kingdom; hence, if mixed in the proportion of measure for measure, it completely covers the smell of all other bodies.

Extract of Patchouly.

Rectified spirit	1 gallon
Otto of patchouly	1¼ oz.
„ rose	¼ oz.

The essence of patchouly thus made is that which is found in the perfumers' shops of Paris and London. Although few perfumes have such a fashionable run, yet, when smelled at in its pure state, it is far from agreeable, having a kind of mossy or musty odour, analogous to Lycopodium; or, as some say, it smells of 'old coats.'

The characteristic smell of Chinese or Indian ink is due to some admixture of this herb and camphor.

The origin of the use of patchouly as a perfume in Europe is curious. A few years ago real Indian shawls bore an extravagant price, and purchasers could always distinguish them by their odour; in fact, they were perfumed with patchouly. The French manufacturers had for some time successfully imitated the Indian fabric, but could not impart the odour.

At length they discovered the secret, and began to import the plant to perfume articles of their make, and thus palm off home-spun shawls as real Indian! From this origin the perfumers have brought it into use. Patchouly herb is extensively used for scenting drawers in which linen is kept; for this purpose it is best to powder the leaves and put them into muslin sacks, covered with silk, after the manner of the

old-fashioned lavender-bag. In this state it is very efficacious in preventing the clothes from being attacked by moths. Several combinations of patchouly will be given in the recipes for 'bouquets and nosegays.'

PEA (SWEET).—A very fine odour may be extracted from the flowers of the chick-vetch by enfleurage with any fatty body, and then digesting the pomade produced in spirit. It is, however, rarely manufactured, because it is possible to prepare the following very close

Imitation of the Essence of Sweet Pea.

Extract of tubereuse		½ pint
„ fleur d'orange		½ pint
„ rose from pomatum		½ pint
„ vanilla		1 oz.

In giving the recipe for 'sweet pea' as above we form it with the impression that its odour resembles the orange-blossom, which similarity is approached nearer by the addition of the rose and tubereuse.

The vanilla is used merely to give permanence to the scent on the handkerchief; and this latter body is chosen in preference to extracts of musk or ambergris, which would answer the same purpose of giving permanence to the more volatile ingredients, because the vanilla strikes the same key of the olfactory nerve as the orange-blossom, and thus no new idea of a different scent is brought about as the perfume dies off from the handkerchief. When perfumes are not mixed upon this principle, then we hear that such and such a perfume becomes 'sickly' or 'faint' after it has been on the handkerchief a short time.

PEPPERMINT.—The finest peppermint is that cultivated at Mitcham, Surrey; the sight of the numerous acres of this plant at that place is alone sufficient to show the public taste for this odour; strictly speaking, however, peppermint is con-

sumed more through the mouth than the nose. Large as is our own consumption, England exports a considerable amount of the otto of peppermint, which is readily obtained from it by distillation.

There are several plants which yield fragrant oils when distilled with steam. Among this class peppermint holds a high place, on account of its exhilarating as well as its aromatic qualities. Without vouching for the correctness of any of the statements there, I insert the following paragraph cut from the 'Scientific American.' It appears to be written in our cousins' usual 'tall' style. If the figures were all reduced to one-tenth of their stated value, I think they would represent nearer the truth.

About 3,000 acres of it are under cultivation in North America, viz. 1,000 in New York and Ohio, and 2,000 in St. Joseph's County, Michigan, which appears to be its head-quarters. It is raised exclusively for its oil, about 7 lbs. of which is the average yield for an acre of plant, the price being 10*s.* per pound. The roots of the peppermint are planted thickly in rows, between which spaces are left for the cultivator to pass. The plant is generally cut about the latter part of August, and placed in small cocks, like those of hay, which are allowed to stand in the fields some days before being taken in for distillation. Great care is exercised to prevent weeds growing among the plants, so as to ensure a pure article of otto. The fields are ploughed up and changed every five years; the first year's crop being generally the most abundant and the purest.

The apparatus for distilling peppermint consists of a boiler for raising steam, a still made of wood for receiving the charge of peppermint, a cooler for condensing the oil, and a receiver into which it flows. The whole apparatus is exceedingly simple. The plants are packed into the wooden still and trampled down with the feet; when a full charge is thus ready the lid of the still is put on and steam admitted at the bottom by a pipe from the boiler. When the peppermint is heated to about 212° Fahr. its otto passes over with the steam into a worm, which is placed in a cooler; and as it condenses into oil and water it then passes out of the worm into a connected receiver, where the otto, as it floats on the surface, is lifted out with dippers, placed in tin cans, and is ready for sale.

The refuse mint taken from the still is placed in piles, dried, and then becomes tolerable fodder for sheep. About 12,000 lbs. of peppermint oil

are shipped to England per annum, and the profits are about 18 per cent. upon the capital invested and the labour required to carry on the entire business.

The peppermints find at Mitcham all the conditions they require to arrive at perfection—a temperate climate, a sandy soil, an abundance of moisture. The Croydon drainage works have, however, reduced the last item, and the mints have suffered accordingly. There are two varieties of peppermint grown at Mitcham, which are there technically termed 'white' and 'black.' The white is the *Mentha piperita* of the botanist; but the black I am unable to define, as it does not agree with any that I can find described. Several good and well-known authorities whom I have invited to see the plant growing at various stages have as yet been unable to help me in this matter; however, the botanical difference only appears to be that the flowers and the leaves of the black mint are much darker in colour than the white. Commercially there is as much as ten shillings per pound difference in the market value of the ottos produced from them, the black being inferior.

It would be a very natural question to ask, Why not grow all white, since it is more valuable than the black? The answer is, that the black variety is far more hardy than the white; hence it will better bear spring frost, longer drought, and climatic influence generally than its ally. Again, the black mint will yield by one-fifth to one-sixth more otto per acre than the white, all conditions being equal. All things, therefore, being considered, it would not be sound farming to cultivate one kind only. The mats of mint do not average in weight more than one-half that of lavender. (For the technical term 'mat' see the article LAVENDER.) Hence twenty mats of peppermint which will fill Piesse and Lubin's large still, will not weigh, at an average, more than half that of the same number of mats of lavender. The word 'average' I use very

frequently advisedly, because it is next to impossible to fix exactly the quantity of mint or lavender that is put into the still or into a single mat, from the fact that of necessity it must vary according to the degree of dryness when the plant is cut—a degree which very sensibly differs every season as well as during the two months' period of the harvest of one year.



WHITE MINT.

Dr. Geiseler, who has conducted some investigations on the respective merits of distilled oil of peppermint by steam heat and by the heat of the naked fire, has arrived at the following conclusions :—

Dried peppermint herb affords by distillation over the naked fire a greater quantity of oil than by distillation by the aid of steam.

The oil obtained by steam distillation is specifically lighter, and of a brighter colour, than that distilled over a naked fire.

By the rectification of the latter by means of steam heat, an oil is obtained which is equal to that obtained by steam distillation, and has a specific gravity of .910, while the oil remaining behind by steam rectification in the retort shows a specific gravity of .930.



BLACK MINT.

Fresh peppermint herb gives by steam distillation and by distillation over a naked fire an equal quantity of otto.

Dried peppermint herb contains two different ottos, possessing different boiling points and different specific gravities. The otto of higher specific gravity must be formed from that of the lower specific gravity during the drying and keeping of the herb, as the freshly-dried herb affords only one otto, of specific gravity .910.

Peppermint is too familiar in the lozenge shape ever to become a favourite as a perfume; nevertheless perfumers use a fair portion of it in scenting soap and in the making of mouth washes: for these, however, it is employed by French perfumers more than by English. The fact is, fine peppermint is a scarcer article with them than us; so by a law of human nature—ever seeking for that which is the most difficult to obtain—the Continental people esteem it more than we do.

One of the most esteemed articles of perfumery manufacture in which peppermint takes the initiative is the renowned *Eau Botot.*

PERU, BALSAM OF.—The odour of this substance resembles very nearly that of vanilla, but it is not so generally pleasing; in appearance it resembles ordinary treacle or molasses. On account of its dark colour it cannot be very much employed in spirit perfumery; but added to soap it imparts its fragrance and at the same time causes the soap to wash with a soft, creamy lather. Balsam of Peru having also the repute of a mild medicinal action upon the skin, soap containing it is said to be 'healing;' hence it is useful in winter for chapped skin: the proportions are, Balsam of Peru 2lbs., curd soap 56lbs., melted together.

Dr. C. Dorat, of La Union, State of Salvador, Central America, has furnished some interesting particulars of its production, which we append.

The tree is handsome, rather widely branching below, diminishing at top, and about fifty feet high. The flowers, which are very odoriferous, appear in the latter part of September and the beginning of October, at the extremities of the branches, generally in pairs, numerous on each stem, white and unequal; calyx of a pale bluish green, and very glutinous, from exuding balsam. Leaves of a dark shining green. The fruit is almond-shaped, winged, and containing a white kernel, with much balsam.

A very superior balsam is sometimes collected from the flowers, but is very scarce, and never found in commerce. The tree produces after five

years' growth, and attains a great age. It prefers a dry and poor soil, but is never found above an altitude of 1,000 feet. The aroma is perceived at a distance of more than 100 yards. The tree having attained the proper age, five or six years, the *coseche*, or collecting, begins with the dry season early in November. The bark, for some distance up, is well beaten on four sides with the back of an axe, or other blunt instrument, until it has separated from the woody part, but without injury or breaking. This requires great care. In performing this operation, four intermediate strips of bark are left untouched, so as not to destroy the vitality of the tree.

Several notches or cuts are now made in the portions of beaten bark with a sharp *machite*, and fire is applied to the openings. The exuding balsam kindles, and is allowed to burn for a certain time, and then extinguished.

The tree in this state is left for fifteen days, and carefully watched; after which time the balsam, which begins to run copiously, is received on cotton rags stuffed into the cuts. When saturated, they are pressed and thrown into the earthenware pots, with boiling water, on which the balsam soon floats like oil. It is occasionally skimmed off and thrown into clean jars, while fresh rags are added. The extraction from the tree is only made during four days of each week—that is, four coseches per month for each tree—and the average produce is from three to five pounds per week. As soon as the supply begins to fail, fresh cuts are made in the bark, fire again applied, and after fifteen days' rest the extraction is resumed. In this manner the collecting continues until the first rains appear in April or May, when all *trabajo* or work ceases.

When thus prepared, the balsam is of a very dark brown colour, dirty, and of the consistency of treacle. It is cleared and cleaned on the spot, by settling and reboiling, when the impure parts rise to the surface and are skimmed off. This impure part is sold for manufacturing an inferior tincture, used medicinally among the Indians.

The balsam in this state is purchased on the coast, at an average of from three to four *reals* per pound. It sometimes undergoes a second clearing, when it fetches a higher price as 'refinado.' When first cleaned it is of an amber colour, which darkens on cooling; finally, after a few weeks, it becomes dark brown.

A good tree, with careful usage, will produce well for thirty years, after which it is allowed to remain five or six years at rest, or, as the Indians say, to renew its strength. After this period it will again yield for several years.

According to a manuscript copy of a papal bull, at present among the old records in Tzalco, *Balsamo Negro* was in such

high estimation, that in 1562 Pio IV., and in 1571 Pio V., issued orders authorising the clergy to use this precious balsam in the consecration of the '*Sagrada Crisma*,' and pronounced it sacrilege to destroy or injure the trees producing it. Copies of these bulls are, I am informed, still in existence among the archives of Guatemala. (See BALSAMS.)

The balsam imported into England as Balsam of Peru, is produced within the department of Sonsonate, in the republic of Salvador, and along the coast of which department the trees from which it is extracted extend for leagues.

In the district of Cuisnagua there are 3,574 trees, which yield altogether only 600 lbs. of the gum annually. With proper care in the extraction each tree would yield from two to three pounds, making the total quantity capable of being produced, in the before-mentioned district, about 10,000 lbs. When the season has been more rainy than usual the product is much lower; but in order to meet this difficulty, the Indians heat the body of the tree by fire,—by this means causing the gum to exude more freely; this operation invariably causes the decay of the tree.

Should this mode of extracting the gum by heat not be put a stop to, the tree will soon disappear from the coast. This fact has been brought to the notice of the Government, and inquiries into the matter have been made in consequence.

The Indians employed in collecting the gum say that such trees as are well shaded yield a greater quantity, but that those which have been planted by hand yield the most. This has been proved by experience, particularly in Calcutta, where a considerable quantity is yearly collected from trees which have been so planted. During the months of December and January, the gum oozes away spontaneously. This class of gum is called 'Calcauzate.' It is orange-coloured, weighs less than the other, emits a strong odour, and is volatile and pungent.

The export of balsam from Salvador in 1855 was 22,804 lbs., valued at 19,827 dollars. On the coast of Chiquimulilla, in Guatemala, there are many trees of the description that yield the balsam; but hitherto it has not attracted the attention of the people of the country to collect it and bring it to market. That part of the coast in the state of Salvador, extending from Acajutla to Libertad, is emphatically termed the 'Balsam Coast,' because there only is collected the article known in commerce as the Balsam of Peru.

The particular district is intermediate to the two ports, and does not reach either of them within three or four leagues. Lying to the seaward

of a low lateral ridge of mountains, the whole tract, excepting a few parts on the borders of the ocean, is so much broken up by spurs and branches thrown off from the main eminence, and so thickly covered by forest, as to be nearly impassable to a traveller on horseback. From this cause it is so rarely visited that very few residents, either of Sonsonate or Salvador, have ever entered it. Within this space are situated some five or six villages, inhabited solely by Indians, who hold no intercourse with other towns than what is necessary for carrying on their peculiar traffic. Their chief wealth is the balsam, of which they take to market from 18,000 to 23,000 lbs. weight annually. It is sold in small portions at a time, in the before-mentioned towns, to persons who purchase for exportation. The trees yielding this commodity are very numerous on this privileged spot, and apparently limited to it: for in other parts of the coast, seemingly identical in soil and climate, rarely an individual of the species is met with. The balsam is extracted by making an incision in the tree, whence it gradually exudes, and is absorbed by pieces of cotton rags inserted for the purpose. These, when thoroughly saturated, are replaced by others, which, as they are removed, are thrown into boiling water. The heat detaches it from the cotton, and the valuable balsam, being of less gravity than the water, floats at the top, is skimmed off, and put in calabashes for sale. This balsam was long erroneously supposed to be a production of South America; for in the early periods of the Spanish dominion, and by the commercial regulations then existing relative to the fruits of this coast, it was usually sent by the merchants here to Callao, and, being thence transmitted to Spain, it there received the name of the Balsam of Peru, being deemed indigenous to that region. The real place of its origin was known only to a few mercantile men.—'The Technologist.'

PETIT GRAIN.—This will be found described under NEROLI.

PINE-APPLE.—Both Dr. Hofmann and Dr. Lyon Playfair have fallen into some error in their inferences with regard to the application of this odour in perfumery. After various practical experiments conducted in a large perfumatory, we have come to the conclusion that it cannot be so applied, simply because, when the essence of pine-apple is smelled at, the vapour, when exceedingly dilute, produces an involuntary action of the larynx, producing cough. Even in the infinitesimal portions it still produces disagreeable irritation

of the air-pipes, which if prolonged, such as is expected if used upon a handkerchief, is followed by intense headache. It is obvious, therefore, that the legitimate use of the essence of pine-apple (butyric ether) cannot be adopted with benefit to the manufacturing perfumer, although invaluable to the confectioner as a flavouring material. What we have here said refers to the artificial essence of pine-apple, or butyrate of ethyloxide, which, if very much diluted with alcohol, resembles the smell of pine-apple, and hence its name; but how far the same observations are applicable to the true essential oil from the fruit or epidermis of the pine-apple, remains to be seen *when* we procure it. As the West Indian pine-apples are now coming freely into the market, the day is probably not distant when demonstrative experiments can be tried; but hitherto, it must be remembered, our experiments have only been performed with a body *resembling in smell* the true essential oil of the fruit. The physical action of all ethers upon the human body is quite sufficient to prevent their application in perfumery, however useful in confectionery, which it is understood has to deal with another of the senses—not of smell, but of taste. The commercial 'essence of pine-apple,' or 'pine-apple oil,' and 'jagonelle pear-oil,' are admitted only to be *labelled* such, but really are certain organic acid ethers. For the present, then, the perfumer must only look on these bodies as so many lines in the 'Poetry of Science,' which, for the present, are without practical application in his art. (For the manufacture of artificial fruit-essence, see Appendix.)

PIMENTO.—Both leaves and berries of this plant yield by distillation a fine otto; that, however, from the berries should be chosen by the perfumer. Several plants yield analogous ottos by the leaf and flower, or the leaf and the bark, such as petty grain from the orange leaf, and neroli from the flower, otto cinnamon from the cinnamon (inner bark), cassia (outer

bark), and cinnamon leaf oil from the leaves. The odour of pimento resembles a mixture of cloves and nutmegs, and in a gamut of odours would be placed on the scale one octave between them.

One hundredweight of cloves will yield eighteen pounds of otto, but a hundredweight of pimento will yield only six pounds of otto ; hence without some real advantage in odour



PIMENTO.

which it has not, pimento cannot commercially take the place of cloves. When the clove crop fails, as it did in 1872, then the pimento could be fully appreciated.

In France the name pimento is applied to several different substances :—1. The pimento of Jamaica, pimento of the English, *amone*, allspice, Jamaica pepper, *Myrtus pimenta* of Linnæus ; 2. Pimento Tabago, coarser than the former, attributed to the *Myrtus acris* ; 3. Crowned pimento,

or Thevet pepper, *Myrtus pimentoides* (Nees d'es) or *Myraia pimentoides* (D.C.); 4. Royal pimento, *myricè gale*; 5. The pimento of the gardens, *Capsicum annuum*, of the family of the Solanaceæ, and the pimento of cayenne, *Capsicum frutescens*, of the same family. The first two only are referred to in this work. (See ALLSPICE.)

Much of the Ylang-Ihlang essence which is shipped from Malay appears to contain an undue proportion of otto of pimento.

PINK (*Dianthus Caryophyllus*).—The clove pink emits a most fragrant odour, "especially at night," says Darwin.

The lavish pink that scents the garden round

is not, however, at present applied in perfumery, except in name.

Imitation Essence of Clove Pink.

Esprit rose	½ pint
„ fleur d'orange	¼ pint
„ fleur de cassie	¼ pint
„ vanilla	2 oz.
Oil of cloves	10 drops

It is remarkable how very much this mixture resembles the odour of the flower, and the public never doubt it being the 'real thing.'

RHODIUM.—When rose-wood, the lignum of the *Convolvulus scoparius*, is distilled, a sweet-smelling oil is procured resembling in some slight degree the fragrance of the rose, and hence its name. At one time—that is, prior to the cultivation of the rose-leaf geranium—the distillates from rose-wood and from the root of the *Genista canariensis* (Canary rose-wood), were principally drawn for the adulteration of real otto of roses; but, as the geranium oil answers so much better, the oil of rhodium has fallen into disuse, hence its comparative scarcity in the market at the present day, though our grandfathers knew it well. One cwt. of wood yields about three ounces of oil.

Ground rose-wood is valuable as a basis in the manufacture of sachet powers for perfuming the wardrobe.

The French have given the name jacaranda to rose-wood, under the idea that the plant called jacaranda by the Brazilians yields it, which is not the case: 'the same word has perhaps been the origin of palisander—palixander, badly written'—*Burnett.*

The essence of rose-wood, or of Rhodes, is liquid, oily, yellowish, has the scent of rose, a bitter flavour, and is lighter than water. Guibourt clearly distinguishes rose-wood from the sweet jacaranda of Brazil. Many other woods of the Leguminosæ and the Lauraceæ are still designated rose-wood.

ROSE.

Go, crop the gay rose's vermeil bloom
And waft its spoils, a sweet perfume,
In incense to the skies.—OGILVIE.

When Nero honoured the house of a Roman noble with his imperial presence at dinner, there was something more than flowers; the host was put to an enormous expense by having (according to royal custom) all his fountains flinging up rose-water. While the jets were pouring out the fragrant liquid, while rose-leaves were on the ground, in the cushions on which the guests lay, hanging in garlands on their brows, and in wreaths around their necks, the *couleur de rose* pervaded the dinner itself, and a rose pudding challenged the appetites of the guests. To encourage digestion there was rose-wine, which Heliogabalus was not only simple enough to drink, but extravagant enough to bathe in. He went even farther, by having the public swimming-baths filled with wine of roses and absinthe. After breathing, wearing, eating, drinking, lying on, walking over, and sleeping upon roses, it is not wonderful that the unhappy ancient grew sick. His medical man touched his liver, and immediately gave him a rose draught. Whatever he ailed, the rose was made in some fashion or another to enter into the remedy for his recovery. If the patient died, as he naturally would, then of him, more than of any other, it might be truly said that 'he died of a rose in aromatic pain.' Dr. Capellini relates the story of a lady who fancied she could not bear the smell of a rose, and who fainted at the sight of one of those flowers, which turned out after all to be artificial.[1]

[1] Mémoire sur l'Influence des Odeurs.

It is a fact that some persons have a great dislike to the smell of the rose. The famous Grétay was an example of this.

This queen of the garden loses not her diadem in the perfuming world. The oil of roses, or, as it is commonly called, the otto, or attar, of roses, is procured (contrary to so many opposite statements) simply by distilling the roses with water.

The otto, or attar, of rose of commerce is derived from the *Rosa centifolia provincialis*. Very extensive rose farms exist at Adrianople (Turkey in Europe); at Broussa and at Uslak (Turkey in Asia); also at Ghazepore, in India.

The cultivators in Turkey are principally the Christian inhabitants of the low countries of the Balkans, between Selimno and Carloya, as far as Philippopolis, in Bulgaria, about 200 miles from Constantinople. Had not the first Russian aggression been 'nipped in the bud,' by the advance of the emblem of the rose, shamrock, thistle, and *fleur-de-lis*, it is nearly certain that the scene of the war would have been laid not in the Crimea, but in the Rose Farms of the Balkan: nevertheless, who is there would have doubted the prowess of the descendants of the Houses of York and Lancaster?

The following is a summary of the production of otto in Roumelia previous to the Russo-Turkish war of 1877-78:—

Kézanlik	27,776 oz.
Guenpsa	12,064 „
Karaja-Bogh	6,144 „
Tchirpan	2,592 „
Koyoun-Tépé	1,888 „
Pazardzik	1,760 „
Yeni-Zaaghra	1,728 „
Zaaghra	1,568 „
	55,520 „

This estimate is based on the average production of the last ten years; but in 1866 it reached 96,000 ounces, and in 1872 it fell to 27,000 ounces. As to the commercial value of the otto, it may fairly be estimated, when pure, at from 25*s.* to 30*s.* per ounce. In round numbers we may therefore say that the rose farms of Roumelia are worth 70,000*l.* to 80,000*l.* per annum. That rose and other flower farms can be established in Fiji, Queensland, and at Swan River, I have but little doubt, and to landowners there I commend the figures recorded.

My friend, Mr. Amerling, a Turkish drug merchant, residing at Constantinople, sends me the following particulars in reply to my request for information of a practical character relating to the production of otto of rose:—

The roses are grown at Kézanlik in Roumelia, and the annual produce is about 500,000 meticaux; 10 or 12 okes[1] of roses will render 1 metical. The process of distilling is the same as that of spirits, *par alembic.* The produce of this year will be less than the previous ones, viz. only 200,000 to 250,000 meticaux.

The cultivation of the roses for extracting otto is the same as for the ordinary roses. I beg to add on the subject of distilling, that you must put in a boiler as many okes of roses as of water, boil the same, and then extract oil *par alembic.* Then you remove from the boiler the roses, and boil again the first extract of the alembic, and it is then the second produce of the alembic that gives the oil of roses.

To 10 okes of roses you may put 40 or 50 okes of water in the boiler or alembic, and boil them well. You may add at the opening of the alembic a bottle which may contain about 7 okes. When full you remove it, and you put another one in its place; and when this also is full, you put in the same way a third one. In this way you obtain about 21 okes of oil in three bottles, of first, second, and third water; then you empty the boiler, and clean it well. Afterwards you pour into it the contents of the first bottle drawn, and boil it. The alembic then will give the oil of roses floating on the water, which you separate. Then you go on with the same process with the second and third bottles. The first bottle produces better oil than the second, and the second better than the third. In the cultivation there is no particular feature, excepting that in the winter you cover the roots with earth, which you break on the approach of summer.

[1] One Turkish oke is about 2½ to 2¾ lbs. English.

The important thing is to collect the roses at day-break, otherwise the roses will not yield so much.

Mr. Blunt, the British Vice-Consul at Adrianople, in his report to the Foreign Office, gives an account of the rose-fields of the vilayet of Adrianople, extending over 12,000 or 14,000 acres, and supplying by far the most important source of wealth in the district. The season for picking the roses is from the latter part of April to the early part of June ; and at sunrise the plains look like a vast garden full of life and fragrance, with hundreds of Bulgarian boys and girls gathering the flowers into baskets and sacks, the air impregnated with the delicious scent, and the scene enlivened by songs, dancing, and music. If the weather is cool in spring, and there are copious falls of dew and occasional showers, the crops prosper, and an abundant yield of oil is secured. The season in 1866 was so favourable that eight okes of petals (less than 23 lb.), and in some cases, seven okes, yielded a miscal of oil. If the weather is very hot and dry it takes double that quantity of petals. The culture of the rose does not entail much trouble or expense. Land is cheap and moderately taxed. In a favourable season a donum (40 paces square) well cultivated will produce 1,000 okes of petals, or 100 miscals of oil, valued at 1,500 piastres ; the expenses would be about 540 piastres—management of the land, 55 ; tithe, 150 ; picking, 75 ; extraction, 260—leaving a net profit of 960 piastres, or about 8*l.* 11*s.* An average crop generally gives about 5*l.* per donum clear of all expenses. The oil is extracted from the petals by the ordinary process of distillation. The attar is bought up for foreign markets, to which it passes through Constantinople and Smyrna.

The otto from different districts slightly varies in odour ; many places furnish an otto which solidifies more readily than others, and, therefore, this is not a sure guide of purity, though many consider it as such. That which was exhibited in the

Crystal Palace of 1851, 'from Ghazepore,' in India, obtained the prize.

The otto of rose which is procured by distillation from the Provence rose of the south of France and of Nice has a very characteristic fragrance, imparted to it I believe by the bees, which carry the pollen of the orange blossoms so numerous in this district into the rose buds. The French otto is richer in stereopten than the Turkish ; an ounce and a half will crystallise in a gallon of spirit at the same temperature that would require three ounces of the best Turkish otto to do the same.

Attar of roses made in Cashmere is considered superior to any other ; a circumstance not surprising, as, according to Hugel, the flower is here produced of surpassing fragrance as well as beauty. A large quantity of rose-water twice distilled is allowed to run off into an open vessel, placed overnight in a cool running stream, and in the morning the oil is found floating on the surface in minute specks, which are taken off very carefully by means of a blade of sword-lily. When cool it is of a dark green colour, and as hard as resin, not becoming liquid at a temperature about that of boiling water. Between 500 and 600 pounds' weight of leaves are required to produce one ounce of the attar.[1]

At Rome, the odour of the rose was in such request, that Lucullus expended fabulous sums, in order to be able to have it at all seasons. But in our day pure otto of roses, from its cloying sweetness, has not many admirers ; when diluted, however, there is nothing equal to it in odour, especially if mixed in soap, to form rose soap, or in pure spirit, to form the esprit de rose. The soap not allowing the perfume to evaporate very fast, we cannot be surfeited with the smell of the otto.

The finest preparation of rose as an odour is made at Grasse and Cannes, in France.

Nothing can be simpler or more primitive than the farming operations. Roses, for example : the field is first scantily manured—especially with

[1] Indian Encyclopædia.

the refuse matter left after the distillation of various plants—it is then ploughed with oxen at the yoke; young plants of roses, procured from layers in the usual way, by tongueing and laying at a joint, or the off-shoots from the mother plant are taken away and planted in rows, two feet from each other, each row being about five feet asunder. Each root before planting should be cut down to within two or three buds, and Nature does the rest. The cabbage Provence rose is the kind cultivated. In the second year a considerable quantity of flowers appears, but it is not until the fourth year that they are fully developed. A plantation of roses well tended will last from six to eight years; but for this the land must be well drained. It requires about seven thousand rose plants to cover an acre, and this acre will produce in an average season five thousand pounds' weight of roses of the value of one penny to three-halfpence per pound, yielding say 30*l.* an acre.[1]

The above quotation refers to the French cultivation of roses, the Turkish system differing somewhat, as will be seen in the further text. Here the flowers are not treated for the otto, but are subjected to the process of maceration in fat, or in oil, as described under JASMINE, HELIOTROPE, VIOLET. It requires 10 kilogrammes of roses to *enfleurage* 1 kilo gramme of grease. The value of the roses varies from 50*c.* to 1*f.* 25*c.* the kilogramme; that is, about 6*d.* to 1*s.* the pound. After the maceration process has been worked for a few days, the pomade is then subject to the *enfleurage* operation.

The rose pomade thus made, if digested in alcohol, say 8 lbs. of No. 24 pomade to 1 gallon of spirit, yields an esprit de rose of the first order, very different in smell to that which is made by the addition of otto to spirit. It is difficult to account for this difference, but it is sufficiently characteristic to form a distinct odour. See the articles on ORANGE FLOWER and NEROLI which have similar qualities, previously described. The esprit de rose made from the French rose pomade is never sold retail by the perfumer; he reserves this to form part of his *recherché* bouquets.

[1] From my Lectures delivered before the Royal Horticultural Society.

Some wholesale druggists have, however, been selling it for some time to country practitioners, for them to form extemporaneous rose-water, which it does to great perfection.

Roses are cultivated to a large extent in England near Mitcham, in Surrey, for perfumers' use, to make rose-water. In the season when successive crops can be got, which is about the end of June, or the early part of July, they are gathered as soon as the dew is off, and sent to London in sacks. When they arrive, they are immediately spread out upon a cool floor; otherwise, if left in a heap, they heat to such an extent, in two or three hours, as to be quite spoiled. There is no organic matter which so rapidly absorbs oxygen, and becomes heated spontaneously, as a mass of freshly-gathered roses.

To preserve these roses, the London perfumers immediately pickle them; for this purpose, the leaves are separated from the stalks, and to every bushel of flowers, equal to about 6 lbs. weight, 1 lb. of common salt is thoroughly rubbed in. The salt absorbs the water existing in the petals, and rapidly becomes brine, reducing the whole to a pasty mass, which is finally stowed away in casks. In this way they will keep almost any length of time, without the fragrance being seriously injured. A good ROSE-WATER can be prepared by distilling 12 lbs. of pickled roses, and 2½ gallons of water. 'Draw' off 2 gallons; the product will be the double-distilled rose-water of the shops. The rose-water that is imported from the south of France is, however, very superior in odour to any that can be produced here. As it is a residuary product of the distillation of roses for procuring the otto, it has a richness of aroma which appears to be inimitable with English-grown roses.

Most commonly a weight of distilled water equal to that of the roses employed is drawn off.

So ancient is the custom of using fragrant waters, that one of the oldest authors repeatedly mentions it. In the 'Arabian Nights' (written prior to the Christian era), in the story of Aboulhassan, it will be remembered that

> When the prince of Persia visited the queen, and that he had partaken of refreshments, the slaves brought him golden basins filled with odoriferous water to wash in, and that after the declaration of love by the queen and the prince they both fainted, but were brought to themselves again by throwing odoriferous water upon their faces, and by giving them things to smell.

> Let one attend him with a silver bason,
> Full of rose-water.—*Taming of the Shrew.*

There are six modifications of essence of rose for the handkerchief, which are the *ne plus ultra* of the perfumer's art. They are—esprit de rose triple, essence of white roses, essence of tea rose, essence of moss rose, twin rose, and Chinese rose. The following are the recipes for their formation :—

Esprit de Rose Triple.

Rectified alcohol	1 gallon
Otto of rose	3 oz.

Those who admire the rose's fragrance will find the following formula yield a most *recherché* quality :—

Piesse's Twin Rose.

Rose pomade (No. 24)	8 lbs.
Spirit (60 over proof)	1 gallon
French otto of rose	1½ oz.

Let the spirit stand on the pomade for a month, then strain it off and add the otto. Mix at a summer heat ; in the course of a quarter of an hour the whole of the otto is dissolved, and is then ready for bottling and sale. In the winter season

beautiful crystals of the otto—if it is good—appear disseminated through the esprit. (It requires twice the quantity of Turkish otto to crystallise at the same temperature.)

Essence of Moss Rose.

Spirituous extract from French rose pomatum . .	1 quart
Esprit de rose triple	1 pint
Extract fleur d'orange	1 pint
„ of ambergris	½ pint
„ musk	4 oz.

Allow the ingredients to remain together for a fortnight; then filter, if requisite, and it is ready for sale.

Essence of White Rose.

Esprit de rose from pomatum	1 quart
„ „ triple	1 quart
„ violette	1 quart
Extract of jasmine	1 pint
„ patchouly	½ pint

Essence of Tea Rose.

Esprit de rose pomade	1 pint
„ „ triple	1 pint
Extract of rose-leaf geranium	1 pint
„ santal wood	½ pint
„ neroli	¼ pint
„ orris	¼ pint

Chinese Yellow Rose.

Esprit rose triple	2 pints
„ tubereuse	2 pints
„ tonquin	¼ pint
„ vervaine	¼ pint

Flowers adapted for the preparation of essence of roses are produced by several species of rose tree. The kinds most

used in France are the *Rosa centifolia* and *damascena.* Essence of rose is a mixture of two essences, one of which is solid up to 95° and boils at 300°: this is a hydrocarbonate; the other is liquid and oxygenated. It is the latter which possesses the odour of the rose. The presence of essence of geranium in that of rose is established by means of sulphuric acid, which has no effect on the otto of geranium. Nitrous vapours turn the essence of rose yellow and the essence of geranium green. Iodine does not colour the former, but it turns the latter brown.

ROSEMARY.

There's rosemary; that's for remembrance.—SHAKESPEARE.

By distilling the *Rosmarinus officinalis* a thin limpid otto is procured, having the characteristic odour of the plant, which is more aromatic than sweet. One hundred weight of the fresh herb yields about 24 ounces of oil.

Rosemary is cultivated to a small extent at Mitcham in Surrey, its general treatment being the same as lavender (see LAVENDER), differing only from that plant in that it requires more years to arrive at a stage of growth sufficient to allow the sickle to be used, for the otto exists most in the leaf and but little in the flower. Otto of English-grown rosemary bears a market value of about ten times that of German, French, or Spanish, in which latter country vast tracts of it are found growing wild. Bertolin states that the odour of rosemary off the Spanish coast, during the harvest season, is perceptible long before the land comes in sight; a somewhat similar story, it will be remembered, is told by the botanist Frangipanni, with regard to the *Plumeria alba* of Antigua.[1]

Otto of rosemary is very extensively used in perfumery, especially in combination with other ottos for scenting soap. Eau de Cologne cannot be made without it, and in the once famous 'Hungary water' it is the leading ingredient. The following is the composition of

[1] See Appendix: *Mercutio Frangipanni*, versified by William Brough.

Hungary Water.

Grape spirit (60 over proof)	1 gallon
Otto of Hungarian rosemary [1]	2 oz.
„ lemon peel	1 oz.
„ balm (*melissa*)	1 oz.
„ mint	½ drachm
Esprit de rose	1 pint
Extract of fleur d'orange	1 pint

It is put up for sale in a similar way to eau de Cologne, and is said to take its name from one of the queens of Hungary, who is reported to have derived great benefit from a bath containing it, at the age of seventy-five years. There is no doubt that clergymen and orators, while speaking for any time, would derive great benefit from perfuming their handkerchiefs with Hungary water, as the rosemary it contains excites the mind to vigorous action, sufficient of the stimulant being inhaled by occasionally wiping the face with the handkerchief wetted with these 'waters.' Shakespeare giving us the key, we can understand how it is that such perfumes containing rosemary are universally said to be so refreshing!

RUE.—What our Lord says (Matthew xxiii. 23, and Luke xi. 42)—'Ye pay tithes of mint and rue, and all manner of herbs, but have omitted the weightier matters of the law'—is indicative that the fragrance of rue had caused it to be grown to an extent sufficient to call for a tithe of it for the church use at a very early period. The odour of rue is exceedingly penetrating and diffusive; on this account it has from time immemorial been esteemed highly prophylactic. The sprigs of rue placed on the bar of the Central Criminal Court will be observed by every visitor to Newgate. The origin of its use there is traced to the time when the prison cell was indeed a never-cleansed den of carnivorous animals. The

[1] The Hungarian rosemary yields quite a different smelling otto to that grown in England.

gaol fever and the gaol distemper were then a natural result of being immured in Newgate; and to prevent infection from 'the prisoners at the bar' to the 'worthy judge,' the practice of distributing rue throughout the court took its rise; and its use is maintained even to the present day. Happily, however, through better discipline, the hygienic properties of rue are not required; but its presence there is an illustration historically worthy of record by some future Macaulay or Knight. Rue yields up its odoriferous principle or otto by distillation: its principal use is in the manufacture of aromatic, toilet, hygienic, and cosmetic vinegars.

RUSSIA LEATHER.—The persistent and agreeable perfume of Russia leather is familiar to many persons. Its manufacture is a State secret and monopoly of the Government; no solution of the mystery has yet got beyond the statement that it owes its odour to the otto of birch bark; but this cannot be so in the main, since all that can be done with that substance will *not* yield the true fragrance of Russia leather.

Failing to produce the odour artificially, so to speak, from birch or any other bark, it struck me to endeavour to extract it from the natural body as found in commerce. To my great gratification I succeeded in obtaining perfect results; moral—before art, try nature! The perfume of Russia leather suitable for the *mouchoir* may be prepared thus: Take Russia leather cuttings, which may be had from most bookbinders, say about half a pound, place them in a wide-mouthed stoppered bottle together with one gallon of alcohol 60 over proof; digest for fourteen days, then strain away the spirit, it will have a dark colour and would stain a white kerchief. To remove the colour filter it through animal charcoal; this will remove also some of its odour, but enough remains; add to the filtrate one pint of esprit de rose triple, and it will be ready for sale.

SAGE.—A powerful-scenting otto can be procured by dis-

tillation from any of the *Salviæ.* It is rarely used, but is nevertheless very valuable in combination for scenting soap. Dried sage leaves, ground, will compound well for sachets.

SANTAL—(*Santalum album*).

> The santal tree perfumes, when riven,
> The axe that laid it low.—CAMERON.

This is an old favourite with the lovers of scent; it is the wood that possesses the odour. The finest santal wood grows



SANTAL WOOD.

in the island of Timor, and the Santal Wood Islands, where it is extensively cultivated for the Chinese market. In the religious ceremonies of the Brahmins, Hindoos, and Chinese, santal wood is burned, by way of incense, to an extent almost beyond belief. The *Santala* grew plentifully in China, but the continued offerings to the numerous images of Boodh have almost exterminated the plant from the Celestial Empire; and such is the demand, that Western Australia

and Timor supply the Chinese markets. England alone would consume tenfold the quantity it does were its price within the range of other perfuming substances. The otto which exists in the santal wood is readily procured by distillation; one hundredweight of good wood will yield about 30 ounces of otto.

Dr. Elliott, who is a resident near Perth, Western Australia, informs me that 'any quantity' of santal wood chips fit for distilling could there be had, for the timber of the santal tree is hewn and exported largely for building purposes in the adjacent countries.

The white ant, which is so common in India and China, eating into every organic matter that it comes across, appears to have no relish for santal wood; hence it is frequently made into caskets, jewel boxes, deed cases, &c. This quality, together with its fragrance, renders it a valuable article to the cabinet makers of the East.

The otto of santal is remarkably dense, and is above all others oleaginous in its appearance, and, when good, is of a dark straw colour. When dissolved in spirit, it enters into the composition of a great many of the old-fashioned bouquets, such as 'Maréchale' and others, the formula of which will be given hereafter. Perfumers thus make what is called

Extrait de Bois de Santal.

Rectified spirits	7 pints
Esprit de rose	1 pint
Essential oil, *i.e.* otto, of santal	3 oz.

All those *Extracts*, made by dissolving the otto in alcohol, are nearly white, or at least only slightly tinted by the colour of the oil used. When a perfumer has to impart a delicate *odeur* to a lady's *mouchoir*, which in some instances costs 'no end of money,' and which it is an object, at any price, to retain unsullied, it behoves his reputation to sell an

article that will not stain a delicate white fabric. Now, when a perfume is made in a direct manner from any wood or herb, as tinctures are made—that is, by infusing the wood in alcohol—there is obtained, besides the odoriferous substance, a solution of colouring and extractive matter, which is exceedingly detrimental to its fragrance, besides seriously staining any cambric handkerchief that it may be used upon; and for this reason this latter method should never be adopted, except for use upon silk handkerchiefs.

The odour of santal assimilates well with rose; and hence, prior to the cultivation of rose-leaf geranium, it was used to adulterate otto of roses; but is now seldom employed for that purpose.

By a 'phonetic' error, santal is often printed 'sandal,' and 'sandel.'

The otto of santal is often adulterated with castor oil, which, being soluble in spirit, is difficult to detect.

SASSAFRAS.—Sassafras is indigenous in North America. It is imported on the continent in the form of stems or of boughs as thick as a man's arm. The bark has the colour of rust, and is more aromatic than the wood. From the wood and the bark are derived by distillation an otto, heavier than water, colourless when fresh, but turning yellow after a time.

Some of the perfumers of Germany use a tincture of the wood of the *Laurus Sassafras* in the manufacture of hair-washes and other nostrums; but as, in our opinion, it has rather a 'physicky' smell than flowery, we cannot recommend the German recipes. The *Eau athénienne*, notwithstanding, has some reputation as a hair-water, but is little else than a weak tincture of sassafras.

SPIKE.—French oil of lavender, which is procured from the *Lavandula Spica*, is generally called oil of spike. (See LAVENDER.)

SPIKENARD (*Nardostachys Jatamansi*).— This odoriferous

plant belongs to the Valerian order; and, although its fragrance is generally considered unpleasant to European nostrils, it is so much admired by Eastern natives that some of the most esteemed Asiatic perfumes are composed of valerian and spikenard. The fragrance of spikenard is frequently mentioned in the Holy Volume. 'While the king sitteth at his table, my spikenard sendeth forth the smell thereof.'—Song



SPIKENARD.

of Solom. i. 12. 'There came a woman having an alabaster box of ointment of spikenard very precious.'—Mark xiv. 3. It is nevertheless almost unknown to English and French perfumers.

The Celtic nard, *Valeriana celtica*, grows on the mountains of Switzerland and the Tyrol. In commerce it is in round or flat packets, mixed with moss and gritty earth. Its flavour is bitter, and its smell resembles that of valerian.

Another species of Indian nard, the nard of the Ganges of Dioscorides, is attributed to the *Nardostachys grandiflora* (D. C.), *Fedia grandiflora* (Wall.). Lastly, the false nard of Dauphiny is the bulb of the *Victoriale longue* of Clestius, *Allium anguinum* of Mathiole de Bauhin.

STORAX.—Priests and perfumers are very much indebted



STORAX.

to that family of plants termed by botanists *Styraceæ*: from one and another of this family vast quantities of odoriferous gums and balsams are procured, which are used for altar incense and for perfuming private dwellings. In commerce there are several kinds of storax: the hard red quality is termed *Jews' incense*; the *Calamita storax* is so named from the Latin *calami* (rushes or quills), in reference to its form in

the market. The true storax, however, to which we now refer, is a fragrant balsam which exudes from the wounded *Liquid-ambar orientale*, a shrubby tree common in Asia Minor.

Extraction of the Liquid Storax.—In June and July, the outer bark is stripped off on one side of the tree, and (according to Lieutenant Campbell) made into bundles and reserved for the purpose of fumigation. The inner bark is then scraped off with a semicircular or sickle-shaped knife, and thrown into pits until a sufficient quantity has been collected. Mr. Maltass states that it is then packed into strong horsehair bags, and subjected to pressure in a wooden lever press. Upon removal from the press, hot water is thrown over the bags, and they are pressed a second time, after which the greater portion of the resin will have been extracted.

Lieutenant Campbell's account is a little different: he says the inner bark is boiled in water over a brisk fire, upon which the resinous part comes to the surface, and is skimmed off. The boiled bark is next put into hair sacks and pressed, boiling water being added to assist in the extraction of the resin, or, as it is termed, *yagh* (*i.e. oil*).

Dr. McCraith says that the storax collectors, who are chiefly a tribe of wandering Turcomans called *Yuruks*, are armed with a triangular iron scraper, with which they scrape off, together with the juice of the tree, a certain quantity of bark, which they collect in leathern pouches suspended to their belts. When a sufficient quantity has been obtained, it is boiled in a large copper, and the separated liquid resin is run into barrels. The residual bark is placed in hair-cloth and pressed in a rude press, the extracted resin being added to the general mass.

The product obtained by the processes here described, is the grey, opaque, semi-fluid resin, well known as *liquid storax*.

The bark from which the *liquid storax* has been extracted, is emptied out of the bags and exposed in the sun to dry, after which it is shipped to the Greek and Turkish islands, and to many towns in Turkey, where it is much esteemed for the purpose of fumigation, although, since the disappearance of the plague, its employment has greatly diminished.

Lieutenant Campbell states that the quantity of *liquid storax* annually extracted, amounts to about 20,000 okes (500 cwt.) from the districts of Giova and Ullà; and 13,000 okes (325 cwt.) from those of Marmorizza and Isgengak.

It is exported in casks to Constantinople, Smyrna, Syria, and Alexandria. Some is also packed with a certain proportion of water in goat-skins, and sent, either by boats or overland, to Smyrna, where it is transferred to casks and shipped mostly to Trieste.[1]

[1] D. Hanbury.

The odour of storax is the uniting link between—as the late lamented Professor Johnston distinguished them—'the smells we dislike' and the 'odours we enjoy;' it connects the fragrance of the jonquille with the stench of coal-tar naphtha; the smell of this latter substance has become familiar, since it is used to dissolve gutta percha, and is commonly known as 'solution.' Now the smell of this naphtha certainly ranks with those 'we dislike;' yet storax, when in bulk, resembles it, 'to a smell;' but, when divided into such an attenuated form as we conceive odours to be given out by living plants, then storax resembles the exquisite fragrance of the jonquille and tubereuse! So the whirlwind and hurricane become the gentle zephyr that makes the 'aspens quiver.' So the fire-proof block of iron becomes, when divided, more combustible than gunpowder. So the silken fibre becomes a rope to stay the course of a ship. So the lightning flash becomes the electricity which makes one's 'hair stand on end.' Quantity is equivalent to an allotropic condition of matter; quantity produces opposite physical effects upon the faculties. About an ounce of storax dissolved in one pint of rectified spirit produces the TINCTURE OF STORAX of the perfumer's laboratory. Its principal use is to give permanence of odour to analogous fragrances that are prepared by maceration: thus extract of tubereuse or jonquille, procured by infusing the tubereuse pomade in spirit, requires for every pint about one ounce of tincture of storax to be added as a 'fixing' to the handkerchief. It is also useful, in combination with other scents, to imitate certain odours of plants: thus it is found in lily of the valley, &c.

Storax and *Tolu* are used in perfumery in the same way as benzoin, namely, by solution in spirit as a tincture. An ounce of tincture of storax, tolu, or benzoin, being added to a pound of any very volatile perfume, gives a degree of permanence to it, and makes it last longer on the handkerchief

than it otherwise would: thus, when any perfume is made by the solution of an otto in spirit, it is usual to add to it a small portion of a substance which is less volatile, such as extract of musk, extract of vanilla, ambergris, storax, tolu, orris, vitivert, or benzoin; the manufacturer using his judgment and discretion as to which of these materials is to be employed, choosing, of course, that which is most compatible and in harmony with the odour he is making. This can be ascertained by reference to the Gamut. Every octave is in harmony.

The power which these bodies have of 'fixing' a volatile substance, renders them valuable to the perfumer, independent of their aroma, which is due in many cases to benzoic and cinnamic acids, slightly modified by an otto peculiar to each substance, and which is taken up by the alcohol, together with a portion of resin. When the perfume is put upon a handkerchief, the most volatile bodies disappear first: thus, after the alcohol has evaporated, the odour of the ottos appears stronger; if it contains any resinous body, the ottos are held in solution, as it were, by the resin, and thus retained on the fabric. Supposing a perfume to be made of ottos only, without any 'fixing' substance, then, as the perfume 'dies away,' the olfactory nerve, if tutored, will detect its composition, for it spontaneously analyses itself, no two ottos having the same volatility: thus, make a mixture of rose, jasmine, and patchouly; the jasmine predominates first, then the rose, and, lastly, the patchouly, which will be found hours after the others have disappeared.

SUMBUL, SUNBAL, or SAMBOLA.—Under these names there has recently been introduced in commerce a root, about the size of beetroot, presenting at the top distinct shoots, and at the bottom several large radicles. It is most frequently cut into small pieces, is covered with a grey epidermis, and shows on the narrowing part rough bristles caused by the destruction of scales originating in the radical shoots. This root,

which is white inside, rapidly falls a prey to insects. On its surface appears an adipose, resinous substance which has exuded from it. It gives a very strong musk-like odour, mixed with odour of angelica. It is supposed to be a product of one of the *umbelliferæ* akin to angelica. It reaches us from Asia by way of Russia. It is less employed in perfumery in France than in Russia, where it is in great vogue on account of its cheapness.

SYRINGA.—The flowers of the *Philadelphus coronarius*, or common garden syringa, have an intense odour resembling the orange blossom: so much so, that the plant is often termed Mock Orange. A great deal of the pomatum sold as pomade surfin, à la fleur d'orange, by the manufacturers of France, is nothing more than fine suet perfumed with syringa blossoms by the maceration process. Fine syringa pomade could be made in England's Colonies at a quarter the cost of what is paid for the so-called orange pomatum.

THYME.—All the different species of thyme, but more particularly the lemon thyme, the *Thymus Serpyllum*, as well as the marjorams, origanum, &c., yield by distillation fragrant ottos, that are extensively used by manufacturing perfumers for scenting soaps; though well adapted for this purpose, they do not answer at all in any other combinations. Both in grease and in spirit all these ottos impart a herby smell (very naturally) rather than a flowery one, and, as a consequence, they are not considered *recherché*.

When any of these herbs are dried and ground, they usefully enter into the composition of sachet powders.

TOLU. (See BALSAMS.)

TONQUIN, or TONKA.—The seeds of the *Dipterix odorata* are the tonquin or *coumarouma* beans of commerce. When fresh they are exceedingly fragrant, having an intense odour of newly made hay. Considerable interest attaches to the plant represented in the accompanying illustration—the Tonquin or tonga bean (*Dipterix odorata*)—inasmuch as it is

one of only eight species included in the genus, all of which are large forest trees of Brazil, Guiana, and the Mosquito coast. The genus is also remarkable for being one of the few belonging to the natural Order *Leguminoseæ*, that have drupaceous or single-seeded, indehiscent pods. The tonquin tree acquires in the forests of British Guiana an average height of about 60 ft. It has alternate leaves composed of from five to seven alternate leaflets. The flowers are borne in racemose panicles, and the fruit, as will be seen, is of a somewhat oval form, consisting of a thick fleshy substance which becomes when mature of a hard, woody character, and



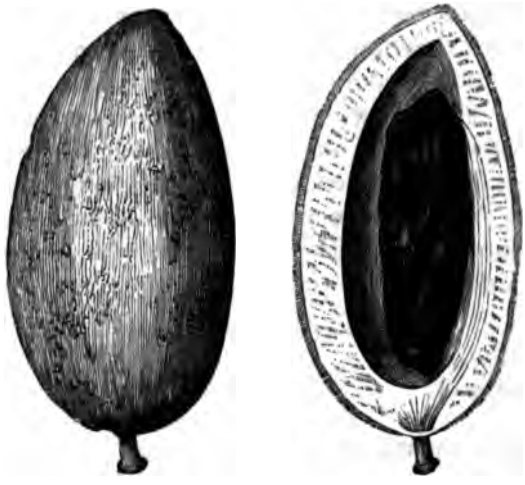
DIPTERIX ODORATA.



TONQUIN BEAN, NATURAL SIZE.

encloses a long, almond-shaped, shining black seed. This seed has a powerful odour, resembling that of newly mown hay. At one time, when snuff-taking was much more general than at present, a tonquin bean was generally kept in the snuff-box for the sake of the agreeable fragrance which it imparted to the snuff. Now, however, the uses of tonquin beans are mostly confined to the preparation of perfumes either for fluid extracts for handkerchiefs or for sachet powders. They are often, moreover, to be seen in hosiers' shops, where they are sold for placing in drawers with linen. For these purposes they are imported into this country to

the extent of a few hundredweights per annum. The Creoles fully appreciate the fragrance of these seeds, and make use of them not only for their perfume, but also for putting in chests or drawers for the purpose, they say, of driving away insects. A closely-allied species of *Dipterix*, namely, *D. eboensis*, a native of the Mosquito country, bears a fruit and seed almost identical in appearance with those of *D. odorata*. It has, however, no perfume, but contains a quantity of thick oil or fat,



TONQUIN BEAN IN POD.

which is extracted by the natives, and used as a hair oil. It was at one time said that this oil formed the basis of a much advertised hair restorer, known as 'Balm of Columbia,' but of this I am unable to give any opinion. With regard to cultivation, the species of *Dipterix* are said to grow best in a loamy soil. They are easily raised from ripened cuttings planted in sand, with a good moist heat, and covered with a hand glass.[1]

[1] J. R. in *The Garden*.

The *Anthoxanthum odoratum*, or sweet-smelling vernal grass, to which new hay owes its odour, probably yields identically the same fragrant principle; and it is remarkable that both tonquin beans and vernal grass, while actually growing, are nearly scentless, but become rapidly aromatic when severed from the parent stock.

Chemically considered, tonquin beans are very interesting, containing, when fresh, a fragrant volatile otto (to which their odour is principally due), a fat oil, and a neutral principle—*Coumarin*. In perfumery they are valuable, as, when ground, they form with other bodies an excellent and permanent sachet, and, by infusion in spirit, the tincture or extract of tonquin enters into a thousand of the compound essences; but on account of its great strength it must be used with caution, otherwise people say the perfume is 'snuffy' owing to the predominance of the odour and its well-known use in the boxes of those who indulge in the titillating dust.

Extract of Tonquin Bean.

Tonquin beans	1 lb.
Rectified spirit	1 gallon

Digest for a month at a summer heat. Even after this maceration they are still useful when dried and ground in those compounds known as POT-POURRI, OLLA PODRIDA, &c. The extract of tonquin, like extract of orris, and extract of vanilla, is never sold pure, but is only used in the manufacture of compound perfumes. It is the leading ingredient in *Bouquet du Champ*—the Field Bouquet—the great resemblance of which to the odour of the hay-field renders it a favourite to the lovers of the pastoral.

Coumarin, $C^{18}H^{6}O^{4}$, exists in several plants, amongst which may be named the sweet vernal grass, *Anthoxanthum odoratum*, the melilot, the sweet woodroffe, &c. Some authors

have confounded it with benzoic acid ; but, contrary to what has been asserted, the tonka bean does not contain this acid. Coumarin is white, it melts at 68°, and boils at 270°. It has a pleasant odour, is more easily soluble in warm water than in cold, and crystallises in straight rectangular prisms.

Among the plants with the odour of tonka beans, in which coumarin has been shown to be present, we may also mention *Orchis fusca.* Lallemant, a druggist at Algiers, sent to the French and Spanish exhibition in 1864, under the name of *Orchis anthropophora,* some leaves possessing a strong tonka bean odour. These might certainly be utilised in perfumery. But, as the plant is scentless with us, perhaps it has been confounded with *Orchis fusca.*

Some of the plants, such as vernal grass and woodroffe, have no odour when freshly gathered, but the scent is developed as the plants dry ; this ordinary observers must have noticed in the hay-field, for good hay always contains vernal grass.

TUBEREUSE (*Polianthes tuberosa*).—One of the most exquisite odours with which we are acquainted is obtained by *enfleurage* from the tubereuse flower. It is, as it were, a nosegay in itself, and reminds one of that delightful perfume observed in a well-stocked flower-garden at evening close; consequently it is much in demand by the perfumers for compounding sweet essences. It requires three kilogrammes of flowers to perfume one kilogramme of grease, and the value of the flowers is about five francs the kilo.

The tubereuse needs more care than any other flower of the farm. It is the most difficult to rear, but the best worth rearing. The tubereuse requires a moist soil, or to be so planted that it can be freely irrigated. It is a bulbous plant, and propagates as they do ; it throws out a stem like a hyacinth, covered with fleshy flowers. The bulbs are planted from nine to twelve inches apart in rows twenty-four inches apart ; and a good plantation in a suitable soil will last from seven to eight years. And oh, what a fragrance breathes from it ! what a bouquet, snatching perfumes from every flower with a superb eclecticism !

The tuberose, with her silv'ry light,
That in the garden of Malay
Is called the mistress of the night,
So like a bride, scented and bright,
She comes out when the sun's away.—MOORE.

This last line of the poet's refers to the marked exhalation of odour after sundown; very many flowers have not only a special time of opening their blossoms, but a particular time when they breathe fragrance, as observed: the jasmine is more fragrant in August than it is in July and September.[1]



TUBEREUSE.

The *enfleurage* laboratory is always kept dark, an artificial inducement (may I say?) for the blossoms to 'work hard.'

Extract of Tubereuse.

Eight pounds of No. 24 tubereuse pomatum, cut up very fine, is to be placed into one gallon of the best rectified spirit. After standing for three weeks or a month at summer heat, and with frequent agitation, it is fit to draw off, and, being strained through cotton wool, is ready either for sale or use in the manufacture of bouquets.

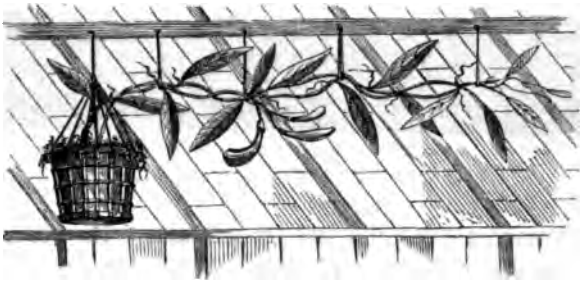
This essence of tubereuse, like that of jasmine, is exceedingly volatile, and, if sold in its pure state, quickly 'flies off' the handkerchief; it is therefore necessary to add some fixing ingredient, and for this purpose it is best to use one ounce of tincture of storax, or half an ounce of extract of vanilla, to every pint of tubereuse.

VANILLA.—The pod or bean of the *Vanilla planifolia* and

[1] From my Lectures before the Horticultural Society on Flower Farming.

aromatica, Swartes, *Epidendrum Vanilla*, L., yields a perfume of rare excellence. When good, and if kept for some time, it becomes covered with an efflorescence of needle crystals, possessing properties similar to benzoic acid, but differing from it in composition: these crystals may be sublimed by heat of sand bath. Few objects are more beautiful to look upon than this, when viewed by a microscope with the aid of polarised light. The finest vanilla is grown in Mexico: the pods or beans are about eight and a half inches long.

An inferior quality, the produce of Central America, is often lotted at the drug sales in London. Of this kind, the



VANILLA PLANT.

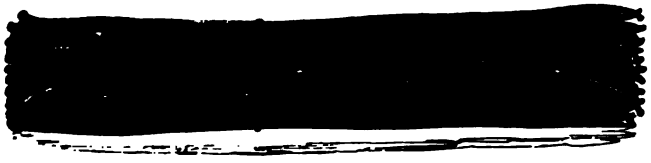
beans are not more than four inches long, and are more pulpy than the true Mexican variety.

In the French markets an inferior kind is frequently on sale, called *vanillon*. It comes from South America. The pods are larger and the odour quite different, somewhat resembling heliotrope.

The cultivation of vanilla, introduced some years ago in the island of La Réunion, has been very successful, and the price has been reduced. In quality, however, the article is not equal to the Mexican vanilla.

Of all orchids this climbing epiphytal one is the most valuable from a commercial point of view, on account of its

scent-yielding fruit. There are several species of vanilla which yield beans or pods more or less fragrant; and of these some five kinds are common in our English markets, the value of which varies from 10*s.* to 80*s.* per lb. The genus Vanilla is indigenous to Peru, Brazil, and Mexico, and some of the species have been successfully cultivated in the West Indian Islands, Ceylon, and the Mauritius. From the last-named wonderfully fine specimens were sent to our International Exhibition of 1862, for which the jurors awarded a gold medal. There is no reason why the culture of vanilla should not be extended into some of our warmer colonies,



BUNDLE OF VANILLA AS IMPORTED.

such as Western Australia and Queensland. Its propagation is by no means difficult. *V. planifolia* climbs up the tallest trees, and its main stock becomes as woody and hard as that of the vine: the root sends up many offsets, which may be separated, and in that way the plant may be increased. Cuttings of the last growths, 2ft. or 3ft. in length, may also be made and rooted successfully. The vanilla will produce saleable pods the third or fourth year after propagation, and they may then be gathered annually, in September, in increasing quantities for thirty or even forty years. Therefore he who plants a vanilla forest leaves his son a valuable heritage. Two good specimens of the plant may be seen in the Orchid House at Kew, and it is also grown plentifully at Syon.

When the pods are gathered, which should be done before they are quite ripe, it is most important that they be properly

cured, otherwise they rapidly become mouldy and lose their scent. Parcels in this condition may often be found at the Mincing Lane drug auctions. The curing of the pods is best effected by drying them in a moderate heat, pressing them with the thumb and finger from end to end, and then brushing them over with an oil that does not itself become rancid, such as that of cocoa or cashew nut. It is at the apex of the pod that the mouldy parasite first appears; the pods then quickly become soft and flabby or dry and chippy. On the other hand, when vanilla pods are in good condition they become covered with an efflorescence of needle-like crystals of vanillic acid. The interior of the bean is then soft, unctuous, and balsamic.

In order to obtain the perfume or essence, ½ lb. of such pods are cut up small, and put into one gallon of pure alcohol, of a strength known as 60° over proof, giving the whole a shake up daily. The ingredients must remain together for, say, four weeks, at which time all that is worth extracting will be found in the spirit, which may then be strained off quite clear and bright. It is then suitable as a flavouring agent, or when blended with other scents it makes delicious perfumery. Those sold under the titles of Clematis, Heliotrope, Wall-flower, &c., mostly contain about one-half in bulk of vanilla extract. About two centuries ago vanilla may be said to have been unknown in this country; it is, however, stated that Morgan, an apothecary, showed to Queen Elizabeth a sample, but he knew nothing more about it than that 'it was brought from abroad by some Spanish merchants.' At the present time the total annual average crop of all the varieties of vanilla from the several countries which produce it may be estimated at 80,000 lbs., representing a value of not less than 150,000*l.*

Johnston states that, 'physiologically, the fragrance of vanilla acts upon the system as an aromatic stimulant, ex-

hilarating the mental functions, and increasing generally the energy of the animal system.' From five to six hundredweights of vanilla are annually imported, on an average, into this country; from some unknown cause, however, this importation is very irregular, and, as a consequence, the price varies considerably, from 10*s.* to 80*s.* per lb. Our West Indian colonists should look to this. They are deploring the loss of commerce, and we are asking for things which *they can produce*, and yet no effort is being made by them to supply European wants. I press this vanilla question on them, because Europe would consume a hundred times as much vanilla as it does were the price reduced by an increased production.

Extract of Vanilla.

Vanilla pods	½ lb.
Rectified spirit	1 gallon

Slit the pods from end to end, so as to lay open the interior, then cut them up in lengths of about a quarter of an inch, macerate with occasional agitation for about a month; the tincture thus formed will only require straining through cotton to be ready for any use that is required. In this state it is rarely sold for a perfume, but is consumed in the manufacture of compound odours, bouquets, or nosegays, as they are called.

Extract of vanilla is also used largely in the manufacture of hair-washes, which are readily made by mixing the extract of vanilla with either rose, orange, elder, or rosemary water, and afterwards filtering.

We need scarcely mention that vanilla is greatly used by cooks and confectioners for flavouring.

There are three kinds of vanilla known in commerce, two of which belong to varieties of the same plant, and the third to a different species. The first, *Vanilla leg.* or *legitimate*, of the Spaniards, is most esteemed. It is often covered with

thin white crystals, and is then said to be *frosted.* It is attributed to the *Vanilla sativa* of Schiede. The second is the *Vanilla simarona* or bastard (*V. sylvestris* of Schiede): it is shorter and not frosted. The third, called *vanillon* by the French, *V. pompona* or *rosa* by the Spaniards, is short and thick. It is attributed to the *V. pompona* of Schiede.

Buchola and Vogel père were in error in taking the crystals of vanilla for benzoic acid. M. Gobley believes that it is a peculiar principle which he names *vanilline*; and this, according to A. Vée, melts at 78°, and in boiling water without being dissolved. It differs from coumarin, which melts at 68°.

VERBENA, or VERVAINE.—The scented species of this plant, the lemon verbena, *Aloysia citriodora* (Hooker), is only cultivated, so far as I am aware, by Señor Robillard, of Valencia. He offers the otto for sale to the trade at 20*s.* the pound weight—a fact which indicates that the plant grows better in Spain than in England, where it will only live out of doors on walls. It gives one of the finest perfumes with which we are acquainted; it is well known as yielding a delightful fragrance by merely drawing the hand over the plant; some of the little vessels or sacs containing the otto must be crushed in this act, as there is little or no odour by merely smelling at the plant.

The otto, which can be extracted from the leaves by distillation with water, on account of its high price is scarcely, if ever, used by the manufacturing perfumer; but it is most successfully imitated by mixing the otto of lemon grass, *Andropogon Citrata*, with rectified spirit, the odour of which resembles the former to a nicety. The following is a good form for making the

Extract of Verbena.

Rectified spirit	1 pint
Otto of lemon-grass	3 drachms
„ lemon-peel	2 oz.
„ orange-peel	½ oz.

After standing together for a few hours and then filtering, it is fit for sale.

Another mixture of this kind, presumed by the public to be made from the same plant, but of a finer quality, is composed thus; it is sold under the title of

Extrait de Verveine.

Rectified spirit	1 pint
Otto of orange-peel	1 oz.
„ lemon-peel	2 oz.
„ citron-zeste	1 drachm
„ lemon-grass	2½ drachms
Extract de fleur d'orange	7 oz.
„ „ tubereuse	7 oz.
Esprit de rose	½ pint

This mixture is exceedingly refreshing, and is one of the most elegant perfumes that is made, and, being white, it does not stain the handkerchief. It is best when sold fresh made, as by age the citrine oils oxidise, and the perfume acquires an ethereal odour, and then customers say 'it is sour.' The vervaine thus prepared enters into the composition of a great many of the favourite bouquets that are sold under the title Court Bouquet, and others which are mixtures of violet, rose, and jasmine, with verbena or vervaine in different proportions. In these preparations, as also in eau de Portugal, and in fact where any of the citrine ottos are used, a much finer product is obtained by using grape-spirit or rectified brandy in preference to the English corn-spirit as a solvent for them. Nor do they deteriorate so quickly in French spirit as in English; whether this be due to the oil of wine (œnanthic ether) which the former contains or not we cannot say, but think it must be so.

VIOLET.

> The forward violet thus did I chide:
> Sweet thief, whence didst thou steal thy sweet that smells,
> If not from my love's breath?—BARD OF AVON.

The perfume exhaled by the *Viola odorata* is so universally admired, that to speak in its favour would be more than superfluous. The demand for the 'essence of violets' is far greater than the manufacturing perfumers are at present able to supply, and, as a consequence, it is difficult to procure the genuine article through the ordinary sources of trade.

Real violet is, however, sold by many of the retail perfumers of the West End of London, but at a price that prohibits its use except by the affluent or extravagant votaries of fashion. The violet farms from whence the flowers are procured to make this perfume are very extensive at Nice, Savoy (now France); also in the neighbourhood of Florence. With us the violet grows anywhere, and almost anyhow; but the terrible sun of Nice, during July and August, is but ill borne by the violet. Consequently, on the farms they are planted under the green shade of the orange and lemon trees, or close to walls and houses. The method of propagation is division of the roots. After the young plants are set out and well rooted, they must have a good dressing of liquid manure, which should be repeated every year, about two months before they throw blossoms. If the plants are on a very dry soil they must be irrigated every fortnight during the summer. They are planted so as to grow in tufts or clusters about a foot apart all round; and this space enables the growers to gather the flowers without treading on them. The old plants should be removed every fifth or sixth year, and young roots substituted. A surface of land, equalling an acre of planting, yields one hundred and eighty to two hundred pounds weight of flowers, valued as an average at two francs the pound. Violets may always be looked upon as an extra crop, growing as they do under the orange and lemon trees. The kind grown is the double Parma. About twenty-five tons weight of violet blossoms are produced annually at Nice. My friend Mr. Steadman grows sixteen acres of violets at Mitcham Road

and Thornton Heath, Surrey; the whole of the flowers produced there are sold for button-hole bouquets. The true smelling principle or otto of violets has recently been isolated by M. March of Nice, a sample of which is to be seen at the Laboratory of Flowers, 2 New Bond Street. A very concentrated solution in alcohol impresses the olfactory nerve with the idea of the presence of hydrocyanic acid, which is probably a true impression. Burnett says that the plant *Viola tricolor* (heart's-ease), when bruised, smells like peach kernels, and doubtless, therefore, contains prussic acid.

It has been remarked, also, that persons who have died from the effects of prussic acid, 'smell like violets.'

The flowers of the heart's-ease are scentless; but the plant evidently contains a principle which, in other species of the viola, is eliminated as the 'sweet that smells,' so beautifully alluded to by Shakespeare.

For commercial purposes, the odour of the violet is procured in combination with spirit, oil, or suet, precisely according to the methods previously described for obtaining the aroma of some other flowers before mentioned, such as those of cassie, jasmine, orange-flower, namely, by maceration, or by *enfleurage*; the former method being principally adopted first, followed by *enfleurage*, and, when 'essence' is required, digesting the pomade in rectified alcohol.

Good essence of violets, thus made, is of a beautiful green colour, and, though of a rich deep tint, has no power to stain a white fabric, and its odour is perfectly natural.

Essence of Violets,

as prepared for retail sale, is thus made, according to the quality and strength of the pomade:—Take from six to eight pounds of the violet pomade, chop it up fine, and place it in one gallon of perfectly clean (free from fusel oil) rectified spirit; allow it to digest for three weeks or a month, then strain off

the essence, and to every pint thereof add three ounces of tincture of orris root, and three ounces of esprit de cassie ; it is then fit for sale.

On account of the inodorous quality of the English spirit, the essence of violet made in Britain is very superior to the continental violet, which always smells of brandy.

We have often seen displayed for sale in druggists' shops plain tincture of orris root, done up in nice bottles, with labels upon them inferring the contents to be 'Extract of Violet.' Customers thus once 'taken in' are not likely to be so a second time.

A good *Imitation Essence of Violets* is best prepared thus :--

Spirituous extract of cassie pomade	1 pint
Esprit de rose, from pomade	½ pint
Tincture of orris	½ pint
Spirituous extract of tubereuse pomade . . .	½ pint
Otto of almonds	3 drops

After filtration it is fit for bottling. In this mixture it is the extract of cassie which has the leading smell, but, modified by the rose and tubereuse, it becomes very much like the violet. Moreover, it has a green colour, like the extract of violet; and as the eye influences the judgment by the sense of taste, so it does with the sense of smell. Extract of violet enters largely into the composition of several of the most popular bouquets, such as extract of spring flowers and many others.

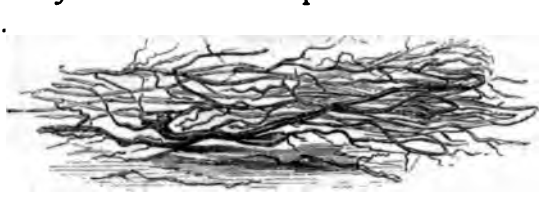
Violet flowers are worth about 4*f.* 50*c.* the kilo, or 2*s.* per pound, and it requires 4 kilos of flowers to enflower one kilo of fat to make the violet pomade. (See WOOD VIOLET.)

VITIVERT, or KUS-KUS, is the rhizome of an Indian grass (*Andropogon muricatus*, Retz). In the neighbourhood of Calcutta, and in that city, this material has an extensive use by being manufactured into awnings, blinds, and sunshades, called Tatties. During the hot seasons an attendant sprinkles water

over them ; this operation cools the apartment by the evaporation of the water, and, at the same time, perfumes the atmosphere, in a very agreeable manner, with the odoriferous principle of the vitivert. It has a smell between the aromatic or spicy odour and that of flowers—if such a distinction can be admitted. We classify it with orris root—not that it has any odour resembling it, but because it has a like effect in use in perfumery, and because it is prepared as a tincture for obtaining its odour.

About four pounds of the dried vitivert, as it is imported, being cut small and set to steep in a gallon of rectified spirits for a fortnight, produces the

Essence of Vitivert of the shops. In this state it is rarely



VITIVERT.

used as a perfume, although it is occasionally asked for by those who, perhaps, have learnt to admire its odour by their previous residence in the 'Eastern clime.' The extract, essence, or tincture of vitivert enters into the composition of several of the much-admired and old bouquets manufactured in the early days of perfumery in England, such as '*Mousseline des Indes*,' for which preparation, M. Delcroix, in the zenith of his fame, created quite a *furor* in the fashionable world. M. Delcroix was a very famous perfumer in his day ; he carried on a large business at 147 New Bond Street, in the time of George IV.

Essence of vitivert is also made by dissolving 2 oz. of otto of vitivert in 1 gallon of spirit; this preparation is stronger than the tincture, as above.

Maréchale and *Bouquet du Roi*—perfumes which have also

'had their day'—owe much of their peculiarity to the vitivert contained in them.

Bundles of vitivert are sold for perfuming linen and preventing moth, and, when ground, it is used to manufacture certain sachet powders.

Otto of vitivert is procurable by distillation; a hundredweight of vitivert yields about 14 oz. of otto, which in appearance very much resembles otto of santal. I have placed a sample of it in the museum at Kew.

In India several other andropogons little known are used for the same purposes as the schœnanthus and vitivert, these being frequently mistaken for each other. They are the *Andropogon Nardus*, (L.) Engl. ginger grass, *A. iwarancusa* (Rosch), *A. parancura* (Blanc), and *A. citratus* (D.C.). To the species *iwarancusa* must be assigned an Indian root frequently used instead of vitivert. It is distinguished by its whiteness and freedom from twists. It has been ascertained by Dr. Stenhouse that the essences extracted from the *Andropogon muricatus*, *Nardus*, and *iwarancusa* are identical.

VOLKAMERIA.—An exquisite perfume is sold under this name, presumed, of course, to be derived from the *Volkameria inermis* (Lindley). Whether it has a smell resembling the flower of that plant we are unable to say. The volkameria blooms in French gardens; that chiefly cultivated is the *V. fragrans*. Its flowers are clustered in globular tufts and exhale a delicious odour. It is a native of Java, while the *V. Kœmpferi* (Willd.) comes from China and Japan. The flowers of the latter are arranged in panicles and furnished with bracts.

Imitation Essence of Volkameria.

Esprit de violette	1 pint
„ tubereuse	1 pint
„ jasmine	¼ pint
„ rose	½ pint
Tincture of musk	2 oz.

WALLFLOWER (*Chieranthus*).

Where the wallflower scents the dewy air.—BURNS.

Exquisite as is the odour of this flower, it is not used in perfumery, though no doubt it might be, and very successfully too, were the plant cultivated for that purpose. To this flower we would direct particular attention, as one well adapted for experiments to obtain its odoriferous principle in this country, our climate being good for its production. The mode of obtaining its odour has been indicated when we spoke of HELIOTROPE and JASMINE. And if it answers on the small scale, there is little doubt of success in the large way, and there is no fear but that the scent of the old English wallflower will meet with a demand. Instigated by this suggestion, made in the first edition of this work, Miss Procter, of Friskney, Lincoln, has produced some very good samples of natural wallflower-pomade.

An imitation essence of wallflower can be compounded thus:—

Extrait de fleur d'orange	1 pint
„ vanilla	½ pint
Esprit de rose	1 pint
Extract of orris	½ pint
„ cassie	½ pint
Essential oil of almonds	5 drops

Allow this mixture to be made up for two or three weeks prior to putting it for sale.

WINTER GREEN (*Gaultheria procumbens*).—A perfuming otto can be procured by distilling the leaves of this plant: it is principally consumed in the perfuming of soaps.

The essence of winter green combines also with the bases to form the salts named *gaultherates*. Salicylous or spiroylous acid, or essence of meadow-sweet, or ulmaria (*Spirea ulmaria*), is obtained artificially by distilling a mixture of salicine,

bichromate of potash, and sulphuric acid. Its formula is $C^{15}\ H^{6}\ O^{4} = C^{15}\ H^{5}\ O^{4}\ H$. (Piria Dumas.)

Upon the strength of the name of this odorous plant a very nice handkerchief perfume is made, called

Iceland Winter Green.

Esprit de rose	1 pint
Essence of lavender	½ pint
Extract of neroly	½ pint
„ vanilla	¼ pint
„ vitivert	¼ pint
„ cassie	½ pint
Otto of Gaultheria	5 minims

ECONOMICAL SCENTS.

As cheap perfumes are often required to fill little fancy bottles, such as are sold at the bazaars, toy-shops, arcades, wheels of fortune, and other places, the following recipes for their manufacture will be found of service:—

I.

Spirit of wine	1 pint
Essence of bergamot	1 ounce

II.

Spirit of wine	1 pint
Otto of santal	1 ounce

III.

Spirit of wine	1 pint
Otto of French lavender	½ ounce
„ bergamot	½ ounce
„ cloves	1 drachm

IV.

Spirit of wine	1 pint
Otto of lemon grass	¼ ounce
Essence of lemons	½ ounce

V.

Spirit of wine	1 pint
Otto of petit grain	¼ ounce
„ orange-peel	½ ounce

Nearly all these mixtures will require to be filtered through blotting paper, with the addition of a little magnesia, to make them bright. What these scents are to be named, we must leave to abler nomenclaturists.

The processes described for procuring the odours of plants are those now in use by the perfumer; future ages will doubtless witness many improvements, although the methods now adopted appear almost perfect. The most marked invention, as a means of winning the odours, of recent date, is that of M. Piver, which is very ingenious, and, although faulty, will probably lead up to something useful and practical. M. Piver's may be termed the Pneumatic Process, since it consists of forcing a current of air into a vessel filled with fresh flowers, and then passed into a second vessel containing grease, which is kept fluid and in which revolve disc plates; the air thus charged with odour from the flowers passes over the grease, and there yields up its scent. The apparatus is so contrived that the same air repeatedly passes through the same vessel.

We may add that in the modification introduced by M. A. Piver in the process of *enfleurage*, the fatty bodies are divided into very fine particles by a vermicular pump so as to present the largest possible surface to the air; and that they



are also confined within a perfectly closed cupboard in which the air circulates.

By this process a new product has also been obtained, for, when the air, having passed over the flowers, is received into a condensing vessel, an intensely odorous water is procured, having in a remarkable degree the fragrance of the flowers employed.

M. Millon, a French chemist, some few years past, patented a process for extracting odours of flowers by means of ether and sulphide of carbon. He places the flowers in a percolator and passes the solvent fluid over them; the liquid which comes away contains the odorous body, together with a considerable portion of wax; on distilling the liquid, the odorous body mixed with the wax remains, being less volatile than either the sulphide of carbon or ether. These products are interesting in a chemical sense, but are of little avail at present to the practical perfumer; nevertheless perfumes extracted by Millon's method are sometimes employed in France.

M. A. Piver, having noticed that in the perfume thus prepared there is always present the smell of sulphuret of carbon, suggested its removal by washes in alkalised water.

There are three very distinct stages in the operation. 1. The dissolving of the perfume. 2. Its distillation, at a low temperature. 3. The evaporation of all vestiges of the solvent.

The solvents employed are ether, chloroform, sulphuret of carbon, and the light essences of petroleum, well rectified. The solution is effected in a special apparatus, but always perfectly closed. The arrangement of the superimposed cylinders allows the displacement of the saturated solvent by new liquids. But as the tension of the vapours of the solvents, invariably too volatile, might obstruct the flow of the liquid, the suction pump of the displacement apparatus of M. Berjot of Caen might be advantageously adopted.

The distillation should be effected at a temperature slightly higher than the boiling point of the solvent; that is to say, at 35° to 40° for ether, 45° for the sulphuret of carbon, and 62° to 68° for chloroform. The vapours must be very much cooled, and the liquids collected in a cooled receiver with a small aperture for the escape of air.

To get completely rid of every trace of the solvent is a difficult matter; and when sulphuret of carbon or the *ethers of petroleum* are used, the agreeableness of the perfume is injured by their bad odour. It is therefore indispensable to remove the last traces of the solvent. For this purpose the residuum of distillation is heated in a waterbath within a closed evaporator, furnished with an agitator; and it is also necessary to drive a current of air through the mass, as M. Piver has proposed. Isolated in this manner, the aroma or perfume of the flowers is yielded in the utmost purity and with all their sweetness. According to M. Piver, one hectare of land planted with heliotrope has yielded a quantity of flowers sufficient, when treated by Millon's method, to produce six kilogrammes of perfume, value 3,000 francs. Four grammes of this perfume suffice for scenting one kilogramme of pomade. For industrial purposes, only the sulphuret of carbon and the ethers of petroleum are available for the extraction of perfumes.

We have now described all the important odoriferous bodies which are used by the manufacturing perfumer, as derived from the botanic kingdom; it may be understood, that where an odoriferous material is unnoticed, it has no qualities peculiar enough to be remarked on, and that the methods adopted for preparing its essence, extract, water, or oil, are analogous to those that have been already noticed—that is, by the processes of

Maceration, *absorption*, or *enfleurage* for flowers,
By *tincturation* for roots, and
By *distillation* for seeds,
modified under certain circumstances.

There are, however, four other important derivative odours —ambergris, civet, castor, and musk—which, being from the animal kingdom, are treated separately from plant odours, in order, it is considered, to render the whole matter easier for reference to manufacturers who may refer to them. Ammonia and acetic acid, holding an indefinite position in the order we have laid down, may also come in here without much criticism, being considered as primitive odours.

On terminating our remarks relating to the simple preparations of the odours of plants, and before we speak of perfumes of an animal origin, or of those compound *odours* sold as bouquets, nosegays, &c., it may probably be interesting to give a few facts and statistics showing the consumption, in England, of the several substances previously named.

THE COMMERCIAL ELEMENTS OF PERFUMERY.

Quantities of Essential Oils or Ottos, paying 1*s. per pound Duty, entered for Home Consumption in the year* 1852.

	lbs.
Otto of bergamot	28,574
„ caraway	3,602
„ cassia	6,163
„ cloves	595
„ lavender	12,776
„ lemon	67,348
„ peppermint	16,059
„ roses	1,268
„ spearmint	163
„ thyme	11,418
„ lemon grass, „ citronella, And other ottos not otherwise described	47,380
Total essential oils, or ottos, imported in one year	195,346

at the duty of 1*s.* per pound, yield a revenue annually of 9,766*l.* 16*s.*

It would appear by the above return that our consumption of otto of cloves was exceedingly small, whereas it is probably ten times that amount. The fact is, several of the English wholesale druggists are very large distillers of this otto, leaving little or no room for the sale and importation of foreign distilled otto of cloves. Again, otto of caraway; the English production of that article is quite equal to the foreign; also, otto of lavender, which is drawn in this country probably to the extent of 6,000 lbs. annually.

There were also passed through the Custom House for home consumption, in 1852—

Pomatums, procured by *enfleurage*, maceration, &c., commonly called 'French pomatums,' average value 6*s.* per pound, and paying a duty of 1*s.* per pound, valued by the importers at	£1,306
Perfumery not otherwise described; value . . .	1,920
Number of bottles of eau de Cologne, paying a duty of 1*s.* each[1]	19,777

Revenue from eau de Cologne manufactured out of England, say 20,000 flacons at 8*d.* = 8,000*l.* annually.

The total revenue derived from various sources, even upon this low scale of duties, from the substances with which 'Britannia perfumes her pocket handkerchief,' cannot be estimated at less than 40,000*l.* per annum. This, of course, includes the duty upon the spirits used in the home manufacture of perfumery. Previously to 1832, the duty on musk in England was 5*s.* an ounce; in 1842, the duty of 6*d.* an ounce produced 53*l.*, showing that 2,120 ounces had been entered for consumption. In 1846 it was declared free of duty. The import now, 1856, is over 3,000 ounces.

Levying an excise duty upon odorous substances is not

[1] The duty on eau de Cologne is now, according to the last tariff, 8*d.* per flacon of 4 oz, or 20*s.* per gallon.

peculiar to England, for it was practised during the Roman Empire. Gibbon says: 'There is still extant a long but imperfect catalogue of Eastern commodities, which, about the time of Alexander Severus, were subject to the payment of duties—cinnamon, myrrh, and a whole tribe of aromatics.'

In order to lay before my readers the commercial statistics of imports and exports of the various matters relating to perfumery up to the latest date, I make the following extracts from the Blue Book.

'A Statement of Trade and Navigation for the year 1860, laid before both Houses of Parliament by command of Her Majesty.'

Statement of the Imports of Perfumery and Odorous Substances into Great Britain, 1860.

Articles	Weight Imported	Computed Value	
Ambergris	356 oz.	£640	All duty free.
Balsam of Tolu	1,975 lbs.	375	
„ Storax, Peru, and others	202 lbs.	23	
„ Camphor, about an eighth part used by perfumers, the rest by druggists	1,668 cwt.	11,359	
„ Civet (1857)	1,476 oz.	1,100	
Enflowered oils and ottos, from France	58,193 lbs.	43,286	
Ottos from Sardinian territories	6,227 lbs.	3,748	
„ Two Sicilies, nearly all bergamot and lemon	128,809 lbs.	57,054	
„ Turkey, nearly all otto of rose	1,567 lbs.	15,895	
„ China and neighbouring Islands, nearly all cassia, nutmeg, anise, cloves, and other spice, patchouly, verbena, &c.	96,244 lbs.	53,506	
„ United States: peppermint, winter green, &c., and Eastern produce	37,306 lbs.	18,484	
„ East Indies, Ceylon, &c.: citronella, lemon grass, spice, geranium	30,648 lbs.	27,731	
Not enumerated from other places	15,853 lbs.	5,033	

Articles	Weight Imported	Computed Value	
Elder flower water	4,073 lbs.	£204	All duty free.
Lavender flowers	8,491 lbs.	98	
Leaves of roses	5,707 lbs.	856	
Musk	6,017 oz.	8,184	
Myrrh: about a quarter of this quantity used by perfumers	280 cwt.	1,960	
Olibanum, principally used as incense in Catholic chapels, &c.	3,057 cwt.	6,936	
Orange flower water: about a quarter of this is used by confectioners, the remainder by perfumers	30,131 lbs.	628	
Orris root	437 cwt.	656	
Enflowered pomatum	19,325 lbs.	1,451	
Rose water	43,441 lbs.	632	
Vanilla: about half this is used in perfumery, the remainder in confectionery	6,132 lbs.	11,910	
Transparent and fancy soap	18,455 lbs.	1,843	
Naples shaving soap	784 lbs.	42	
Crème d'Amande	28,904 lbs.	136	
Hungary water and eau de Cologne shipped from Holland	7,845 bott.	328	
„ „ Belgium	2,090 bott.	89	
„ „ France	3,580 bott.	149	
„ „ other ports	430 bott.	14	
Total value of perfumery imported		£274,350	

The average importation of musk, per annum, for the past five years, is		9,388 oz.	£10,688
The export „ „		1,578 oz.	2,143
Leaving for home consumption every year		7,810 oz.	£8,545
Average importation per annum, for the past five years	Otto of rose	1,117 oz.	£13,561
	Vanilla	3,525 lbs.	12,568
	Ambergris	225 oz.	225
	Civet	355 oz.	300
	Orris root	420 cwt.	

About half the vanilla imported is exported to our colonies and America, the other half being consumed at home.

But very little of the other articles named are exported.

Invoice Value of English Manufactured Perfumery Exported in 1860:—

Mostly undervalued in order to evade the tariff of several ports.

To Russia	£2,524
Hamburg	3,522
Holland	1,188
Belgium	1,539
France	2,018
Egypt	2,050
China	1,656
Hong-Kong	2,753
Porto-Rico	
United States	6,018
Brazil	2,316
British Possessions in South Africa	4,272
Mauritius	1,552
British East Indies	20,861
Australia	10,415
Canada	2,655
West Indies and British Guiana	7,294
Other Countries	13,831
	£86,464

These returns are known to be very imperfect, and would be more correctly represented as a total of 186,000*l.*!

All these figures, I regret to say, are now twenty years old; but the difficulty of obtaining information from the authorities as to exports and imports of perfumery is the only apology that I can offer for this deficiency. The perfumery trade has been no exception to other trades, which have increased something like three or four to one during this period.

SECTION VI.

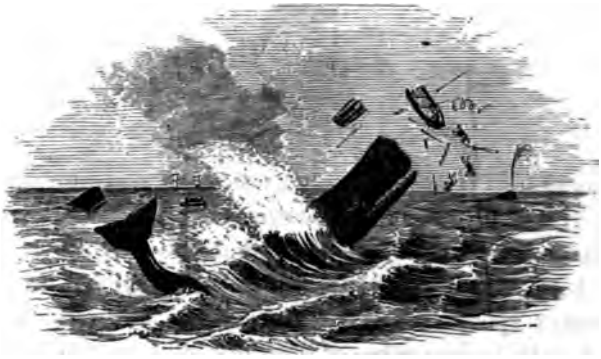
PERFUMES OF ANIMAL ORIGIN.

IN the previous articles we have only spoken of the odours of plants; we now enter upon those materials of an animal origin used in perfumery. The first under our notice is—

AMBERGRIS.—This substance is found in the sea, floating near the islands of Sumatra, Molucca, and Madagascar; also on the coasts of America, Brazil, China, Japan, and the Coromandel. The western coast of Ireland is often found to yield large pieces of this substance. The shores of the counties of Sligo, Mayo, Kerry, and the Isle of Arran are the principal places where it has been found. In the 'Philosophical Transactions' there is an account of a lump found on the beach of the first-mentioned county, in the year 1691, which weighed 52 oz., and was bought on the spot for 20*l.*, but which afterwards was sold in London for more than 100*l.* ('Philos. Trans.,' No. 227, p. 509). We are quite within limit in stating that many volumes concerning the origin of ambergris have been written, but the question respecting it is still at issue. It is found in the stomachs of the most voracious fishes, these animals swallowing, at particular times, everything they happen to meet with. It has been particularly found in the intestines of the spermaceti whale, and most

commonly in sickly fish, whence it is supposed to be the cause or effect of disease.

Some authors, and among them Robert Boyle, consider it to be of vegetable production, and analogous to amber; hence its name amber-*gris* (grey) grey amber. It is not, however, within the province of this work to discuss the various theories about its production, which could probably be satisfactorily explained if our modern appliances were brought to bear upon the subject. The field is open to any scientific enthusiast,—all recent authors who mention it,



SPERM OR AMBERGRIS WHALE.

merely quoting the facts known more than a century ago, nay more, for in the sixth voyage of Sindbad the Sailor, he says:—

Instead of taking my way to the Persian Gulf, I travelled once more through several provinces of Persia and the Indies, and arrived at a sea-port, where I embarked on board a ship, the captain of which was resolved on a long voyage.

Shortly afterwards they were wrecked, and then, describing the place, Sindbad says:—

Here is also a fountain of pitch and bitumen, that runs into the sea,

which the fishes swallow, and then vomit it up again, turned into *ambergris!*[1]

Captain Buckland considers ambergris to be nothing more or less than the fæces of the whale, and from numerous observations of ambergris I think I can inductively substantiate this fact.

It is known that the ambergris whale feeds upon the cuttle fish. The snout of this creature is armed with a sharp-pointed curved black horn, exceedingly hard, tough, and



indestructible. It is here represented, and resembles a bird's beak. It will be observed, however, that the lower mandible is the largest, being the reverse to that of a parrot.

On breaking up good specimens of ambergris I invariably find perfect specimens of this beak, which appear to have escaped or to be incapable of digestion, and are thus excreted together with biliary matter.

It is said by Dr. Ure that the Chinese try the genuineness of ambergris by scraping it fine upon boiling tea: it should dissolve, and diffuse itself generally. Dr. Thuddicum is at work on ambergris; we may expect therefore shortly to be in possession of all the chemical qualities of this curious substance.

A modern compiler, speaking of ambergris, says: 'it

[1] No doubt the writer was wrecked somewhere on the coast of the province of Pegu, near Rangoon, where there are natural petroleum springs to this day; and it is something to say of science that in our time beautiful white wax-like, or true paraffin, candles are made from this Rangoontar, but which, in Sindbad's time, 'was swallowed by fishes and turned into ambergrs!'

smells like dried cow-dung.' Never having smelled this substance, we cannot say whether the simile be correct; but we certainly consider that its perfume is most incredibly overrated; nor can we forget that Homberg found that 'a vessel in which he had made a long digestion of the human fæces had acquired a very strong and perfect smell of ambergris, insomuch that any one would have thought that a great quantity of essence of ambergris had been made in it. The perfume (*odour?*) was so strong that the vessel was obliged to be moved out of the laboratory.' (Mem. Acad. Paris, 1711.)

Nevertheless, as ambergris is extensively used as a perfume, in deference to those who admire its odour, we presume that it has to many an agreeable smell.

Like bodies of this kind undergoing a slow decomposition, and possessing little volatility, it, when mixed with other very fleeting scents, gives permanence to them on the handkerchief, and for this quality the perfumer esteems it much.

Essence of Ambergris.

Spirit	1 gallon
Ambergris	3 oz.

Let it stand for a month.

It is only kept for mixing; when retailed, it has to be sweetened up to the public nose; it is then called, after the Parisian name,

Extrait d'Ambre.

Esprit de rose triple	½ pint
Extract of ambergris	1 pint
Essence of musk	½ pint
Extract of vanilla	2 oz.

This perfume has such a lasting odour, that a handkerchief being well perfumed with it, will still retain an odour even after it has been washed.

The fact is, that both musk and ambergris contain a

substance which clings pertinaciously to woven fabrics, and, not being soluble in weak alkaline leys, is still found upon the material after passing through the lavoratory ordeal.

Powdered ambergris is used in the manufacture of cassolettes—little ivory or bone boxes perforated—which are made to contain a paste of strong-smelling substances, to carry in the pocket or reticule; also in the making of peau d'Espagne, or Spanish skin, used for perfuming writing-paper and envelopes, and which will be described hereafter.

After the numerous hypotheses which have been formed as to the origin of ambergris, it is now admitted to be a kind of intestinal calculus ejected by the whale, *Physeter macrocephalus*, a cetacean mammifer. M. Guibourt has shown that the amber takes a pleasant odour on oxidation in contact with the air. By its nature it ranks at once with biliary calculi.



CASTOR PODS.

CASTOR.—This is a secretion of the *Castor Fiber*, or Beaver, very similar in many of its characters to civet, though in odour quite dissimilar. So long as perfumers can obtain musk or civet, they are not likely to employ castor; but, nevertheless, it has qualities that recommend it in some instances, especially on the score of economy.

Castor is imported from Canada and the territories of the Hudson's Bay Company. It is contained in small pear-shaped membranous sacs, generally hard and brittle in this country, but is said to be soft and pasty when taken from the animal. The sketch illustrates the castor pods a quarter natural size.

In a dry state castor has but little odour, in this respect

resembling ambergris's, but when infused in spirit its scent is developed in a remarkable degree.

Two ounces of castor in one gallon of spirit will make a standard extract; but, like musk and civet, if more than a quarter of a pint of this extract be mixed with a gallon of any other scent, its characteristic odour becomes evident above the others. Perfumes containing it last well on the handkerchief, but there are very few persons who consider it nice.

The largest beavers measure in length, from the snout to



CASTOR BEAVER.

the end of the tail, about 1 metre to 1 *m.* 30 *c*, and in size about the chest 30 to 40 centim. They are distinguished by the form of the head, which is as broad as it is long. In each jaw are ten teeth—two incisors in front and four molars on each side. The lower incisors are longer than the upper. They are yellow outside and white within: their upper extremity is sharp and bevelled, the molars are flat at top. The breasts are four in number; two near the throat, and two near the chest. The skin is covered with hair of two kinds—one short, grey, fine and very thick; the other brown and strong. Each paw has five fingers; those of the fore

paws are free, those of the hind are palmate. The tail is covered with scales.

The bags of castoreum are found on the female beavers. It is not true that the animal cuts or bites them off when pursued by hunters. For the bags are sheathed, not pendant, and are out of the animal's reach.

In Canada, as in Siberia, the beavers live in solitary pairs, in burrows excavated in the banks of rivers; but in winter they assemble in large bands and construct with fallen trees, branches, stones, and earth, dikes across rivers, and very substantial dwelling-places. They are hunted in winter because their fur is then most sought after.

In commerce two kinds of castoreum are known, differing not only in respect to the form and size of the bags, but also as to their chemical constitution and the nature of the perfume.

CIVET.—This substance is secreted by the *Viverra Civetta*, or civet cat. It is formed in a large double glandular receptacle between the anus and the pudendum of the creature. Like many other substances of Oriental origin, it was first brought to this country by the Dutch.

The Dutch used to keep numbers of civets alive at Amsterdam, for the purpose of collecting the perfume when secreted. When a sufficient time had been allowed for the process, the animal was put into a long wooden cage, so narrow that it could not turn itself round. The cage being opened by a door behind, a small spatula, or spoon, was introduced through the orifice of the pouch, which was carefully scraped, and its contents put into a vessel. This operation was performed twice or thrice a week. About a drachm at a time is thus obtained, and the animal was said to produce more civet when irritated. The quantity depended chiefly on the quality of the nourishment it took, and the appetite with which it ate. In confinement its favourite food

was boiled meat, eggs, birds, and small animals, and particularly fish.

A good deal of the civet now brought to European markets is from Calicut, capital of the province of Malabar, and from Bassora on the Euphrates, and from Abyssinia, where the animal is reared with much tenderness. A living specimen may be seen at the Zoological Gardens, Regent's Park.

Civet must have been used in England in Shakespeare's time, for he mentions it, as also musk, in several plays.

> Give me an ounce of civet.—*Lear*, iv. 6.
> He rubs himself with civet.—*Much Ado*, iii. 2.
> Hands are perfumed with civet.—*As You Like It*, iii. 2.



CIVET CAT.

In its pure state, civet has, to nearly all persons, a most disgusting odour. Massinger makes one of his characters say—

> Lady, I would descend to kiss thy hand,
> But that 'tis gloved,[1] and civet makes me sick.

But when diluted to an infinitesimal portion, its perfume is agreeable. It is difficult to ascertain the reason why the

[1] Such observations as the following occur not unfrequently in Nichols's *Royal Progresses:* 'Three Italians came unto the queen, and presented her each with a pair of sweet gloves.'

Edward de Vere, Earl of Oxford, the first person who brought embroidered

same substance, modified only by the quantity of matter presented to the nose, should produce an opposite effect on the olfactory nerve; but such is the case with nearly all odorous bodies, especially with ottos which, if smelled at, are far from nice, and in some cases positively nasty—such as otto of neroli, otto of thyme, otto of patchouly; but if diluted with a thousand times its volume of oil, spirit, &c., then their fragrance is delightful.

Otto of rose to many has a sickly odour; but when eliminated in the homœopathic quantities which rise from a single rose-bloom, who is it that will not admit that 'the rose is sweet'? The odour of civet is best imparted, not by actual contact, but by being placed in the neighbourhood of absorbent materials. Thus, when spread upon leather, and placed in a writing-desk, it perfumes the paper and envelopes delightfully, so much so that they retain the odour after passing through the post. 'Valentines' are thus scented.

For the purpose of making clear the difference between the real civet cat, *Viverra Civetta* (L.), or scented civet, and the zibeth, *Viverra Zibetha* (L.), we give figures of both animals on the next page.

gloves into England, presented a pair to the queen, who took such pleasure in the gift, that she was pictured with them in her hand. [A pair of Queen Elizabeth's gloves, which are to be seen to this day, are exhibited in a case in the Bodleian Library, Oxford.—S. P.] The 'embroidered' and 'sweet' gloves here referred to had been recently introduced into this country from Spain and Venice, which excelled all other seats of the trade in the delicacy of their productions, and likewise imparted to them the additional charm of a fragrant scent. But the perfumed glove has ever had an evil reputation, from the circumstance that it was not unfrequently used as an agent in the conveyance of poison. The Queen of Navarre, having received a pair from the court of France, and accepted them as a pledge of safe conduct, met her death by their means—a fate which is also supposed to have befallen the beautiful Gabrielle d'Estrées. The modern French manufacturers, taking a hint from the former practice of Continental craftsmen, were in the habit very recently of attempting to impart a fragrance to some of their gloves; but failing in the abstruse chemical knowledge which distinguished the Italians, they used a preparation of myrtle leaves, that quickly evaporated on exposure to the air.—*Chambers's Journal.*

The first inhabits the hottest countries of Africa, from Guinea and Senegal to Abyssinia; the second is found in the two peninsulas of India, the Moluccas and the Philippines. This is distinguished by its shorter and tufted hair, the absence of a mane, its round tail with short thick whitish



VIVERRA CIVETTA.

hair and half-rings of black hair. It produces the civet perfume.[1]

La Peyrouse has described, under the name of a musk animal, a third species of civet cat, *Viverra base*, which likewise produces a perfume.



VIVERRA ZIBETHA.

Extract of Civet is prepared by rubbing in a mortar one ounce of civet with an ounce of orris-root powder, or any

[1] Chaillu: 'Recherches pour servir à l'histoire anatomique des glandes odorantes des mammifères.'—*Annales des sciences naturelles*, Sept. 1873.

other similar material that will assist to break up or divide the civet, and then placing the whole into a gallon of rectified spirits; after macerating for a month, it is fit to strain off. It is principally used as a 'fixing' ingredient, in mixing essences of delicate odour. The French perfumers use the extract of civet more than the English manufacturers, who seem to prefer extract of musk. From a quarter of a pint to half a pint is the utmost that ought to be mixed with a gallon of any other perfume.

MUSK-RAT, or ONDATRA.—This creature, a native of Canada, is a quadruped of the family of the field-mice. In the males are found two pear-shaped glands, whose excretory duct terminates just below the prepuce. The female likewise has two glands; but they are smaller, and their duct opens near the urethra. The follicles of these glands secrete a liquid white as milk, and smelling strongly of musk. This odour is communicated to the hair and the tail.

The *musk-rat of the Antilles*, or the *pilori*, is a true rat. The musk-rat of Russia, or *desman*, is an insectivorous mammifer, whose snout is furnished with a flexible proboscis. It has under its tail follicles which secrete a musk-scented substance, which imparts its odour to the flesh of the pike which feed on the desmans. The ducts of the musk-rat are not used in perfumery; the above facts are here given for the reader's information.

MUSK.

So sweetly, all musk.—*Merry Wives*, ii. 2.

This extraordinary substance, like civet, is an animal secretion; it is contained in excretory follicles about the navel of the male animal. In the perfumery trade these little bags are called 'pods,' and as imported it is called 'pod musk.' When the musk is separated from the skin or sac in which it is contained, it is then called 'grain musk.'

The musk-deer (*Moschus moschatus*) is an inhabitant of

the great mountain range which belts the north of India, and branches out into Siberia, Thibet, and China. It is also found in the Altai range, near Lake Baikal, and in some other mountain ranges, but always on the borders of the line of perpetual snow. It is from the male animal only that the musk is obtained.

It formerly was held in high repute as a medicine, and is still so among Eastern nations. It will be remembered that the newspaper paragraphs told us that the last dose which the Emperor Nicholas of Russia swallowed before his death (1855) was a potion of musk. The musk from Boutan, Tonquin, and Thibet, is most esteemed; that from Bengal is inferior, and from Russia is of still lower quality. The strength and the quantity produced by a single animal varies with the season of the year and the age of the animal. A single musk-pod usually contains from two to three drachms of grain musk. Musk is imported into England from China, in caddies of from 20 to 30 ounces each. When adulterated with the animal's blood, which is often the case, it forms into lumps or clots; it is sometimes also mixed with a dark, friable earth. Those pods in which little pieces of lead are discovered, as a general rule, yield the finest quality of musk; upon the idea, we presume, that the best musk is the most worthy of adulteration. Musk is remarkable for the diffusiveness and subtlety of its scent; everything in its vicinity soon becomes affected by it, and long retains its odour, although not in actual contact with it. For this reason the late Hon. East India Company ordered that no musk be brought in the same ship with tea.

The Musk-Deer.

This little, persecuted animal would probably have been left undisturbed to pass a life of peace and quietness in its native forests, but for the celebrated perfume with which nature has provided it. Its skin being worthless from its small size, the flesh alone would hold out no inducement for the villagers to hunt it while larger game was more easily pro-

curable, and its comparative insignificance would alike have protected it from the pursuit of the European sportsman. As the musk, however, renders it to the Puharries the most valuable of all, no animal is so universally sought after in every place it is known to inhabit. Musk is in demand in nearly every part of the civilised world ; yet little, I believe, is known of the nature and habits of the animal that produces it.

The musk-deer is rather more than three feet long, and stands nearly two high at the shoulder; but they vary considerably in size, those found in thick shady woods being invariably larger than those on rocky open ground. The head is small, the ears long and erect. The male has a tusk depending from each upper jaw, which, in a full-grown animal, is about three inches long, the thickness of a goose-quill, sharp pointed, and curving slightly backwards. The general colour is a dark speckled

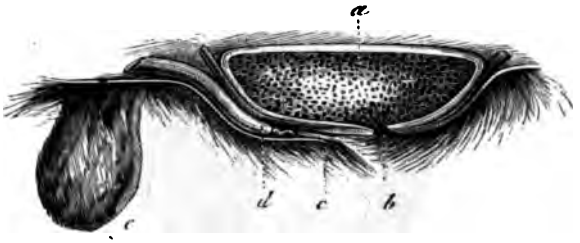


THE MUSK-DEER.

brownish-grey, deepening to nearly black on the hind-quarters, where it is edged down the inside of the thighs with reddish yellow. The throat, belly, and legs are of a lighter grey. Legs long and slender; toes long and pointed; the hind heels are long, and rest on the ground as well as the toes. The fur is composed of thick spiral hairs, not unlike miniature porcupine-quills; they are very brittle, breaking with a slight pull, and so thickly set that numbers may be pulled out without altering the outward appearance of the fur. It is white from the roots to nearly the tips, where it gradually becomes dark. The fur is much longer and thicker on the hind parts than the fore, and gives the animal the appearance of being much larger in the hind-quarters than the shoulder. The tail, which is not seen unless the fur is parted, is an inch long, and about the thickness of a thumb; in females and young animals it is covered with hair,

but in adult males is quite naked, except a slight tuft at the end; and often covered, as well as all the parts near it, with a yellowish waxy substance.

The musk, which is much better known than the deer itself, is only found in adult males; the females have none, neither has any portion of their bodies the slightest odour of musk. The dung of the males smells nearly as strong as musk; but, singularly enough, neither in the contents of the stomach, nor bladder, nor in any other part of the body, is there any perceptible scent of musk. The pod, which is placed near the navel, and between the flesh and skin, is composed of several layers of thin skin, in which the musk is confined, and has much the appearance of the craw or stomach of a partridge, or other small gallinaceous bird, when full of food. There is an orifice outwards through the skin, into which, by a slight pressure, the little finger will pass, but it has no connection what-



THE MUSK APPARATUS.

a, vertical section of musk-pod; *b*, orifice of the pod; *d*, gland carried by filiform prolongation into the urethra.

ever with the body. It is probable that musk is at times discharged through this orifice, as the pod is often found not half full, and sometimes nearly void.[1]

The accompanying figures will show the arrangement of the musk-pod upon the animal, and separate.

The musk itself is in grains, from the size of a small bullet to small shot, of irregular shape, but generally round or oblong, together with more or less in coarse powder. When fresh it is of a dark reddish-brown

[1] [From this orifice the dealers extract the grain musk, and then insert in its place the pieces of lead, brass, copper, skin, dried blood, clay, and other adulterations generally found in the pods when opened in England, and from the size of these orifices it can be pretty fairly judged how the pods have been tampered with.—S. P.]

colour; but, when taken out of the pod and kept for any length of time, becomes nearly black. In autumn and winter the grains are firm, hard, and nearly dry; but in summer they become damp and soft, probably from the green food the animals then eat. It is formed with the animal, as the pod of a young one, taken out of the womb, is plainly distinguishable, and indeed is much larger in proportion than in grown-up animals. For two years the contents of the pod remain a soft milky substance, with a disagreeable smell. When it first becomes musk, there is not much more than the eighth of an ounce; as the animal grows it increases in quantity, and in some individuals as much as two ounces is found. An ounce may be considered as the average from a full-grown animal; but, as many of the deer are killed young, the pods in the market do not perhaps contain, on an average, more than half an ounce. Though



MUSK-POD, ACTUAL SIZE.

not so strong, the musk of young animals has a much pleasanter smell than that of old ones; but difference of food, climate, or situation, as far as my experience goes, does not at all affect the quality.

From the first high ridge above the plains to the limits of forests on the snowy range, and for perhaps the whole length of the chain of the Himalayas, the musk-deer may be found upon every hill of an elevation above 8,000 feet which is clothed with forest. On the lower ranges it is comparatively a rare animal, being confined to near the summits of the highest hills, as we approach the colder forests near the snow; but it is nowhere particularly numerous; and its retired and solitary habits make it appear still more rare than it really is. Exclusively a forest animal, it inhabits all kinds of forest indiscriminately, from the oaks of the lower hills to the stunted bushes near the limits of vegetation. If we may judge from

their numbers, the preference seems to be given to the birch forests, where the underwood consists chiefly of the white rhododendron and juniper.

In many respects they are not unlike hares in habits and economy. Each individual selects some particular spot for its favourite retreat, about which it remains still and at rest throughout the day, leaving it in the evening to search for food, or to wander about, returning soon after daylight. They will occasionally rest for the day in any place where they may happen to be in the morning ; but in general they return to near the same spot almost every day, making forms in different quarters of their retreat a little distance from each other, and visiting them in turn. Sometimes they will lie under the same tree or bush for weeks together. They make forms in the same manner as hares, levelling with their feet a spot large enough for the purpose if the ground is too sloping. They seldom, if ever, lie in the sun, even in the coldest weather, and their forms are always made where there is something to shelter them from its rays. Towards evening they begin to move, and during the night appear to wander about a good deal, from top to bottom of the hill, or from one side to another. In the day they are seldom seen moving about. Their nocturnal rambles are apparently as much for recreation as in search of food, as they often visit regularly some steep ledge of rock or precipice, where there is little or no vegetation. The Puharries believe that they come to such places to play and dance with each other, and often set their snares along the edge of such a ledge or precipice, in preference to the forest.

If not walking leisurely and slowly along, the musk-deer always goes in bounds, all fours leaving and alighting on the ground together. When at full speed these bounds are sometimes astonishing for so small an animal. On a gentle slope I have seen them clear a space of more than sixty feet at a single bound, for several successive leaps, and spring over bushes of considerable height at the same time. They are very sure-footed, and, although a forest animal, in travelling over rocky and precipitous ground have perhaps no equal. When even the burrell is obliged to move slowly and carefully, the musk-deer bounds quickly and fearlessly; and, although I have often driven them on to rocks which I thought it impossible they could cross, they have invariably found a way in some direction, and I have never known an instance of one missing its footing, or falling, unless wounded.

They eat but little compared with other ruminating animals; at least one would imagine so from the small quantity found in their stomachs, the contents of which are always in such a pulpy state that it is impossible to tell what food they prefer. I have often shot them whilst feeding, and found in the mouth or throat various kinds of shrubs or grasses, and often the long white moss that hangs so luxuriantly from the trees in the

higher forests. Roots also seem to form a portion of their food, as they scratch holes in the ground, like many of the hill pheasants. The Puharries believe that the males kill and eat snakes, and feed upon the leaves of the 'kedar patta,' a small and very fragrant-smelling laurel, and that the musk is produced by this food. They may probably eat the leaf of this laurel amongst other shrubs; but from the few occasions upon which I have seen this laurel stripped of any portion of its leaves, it does not appear to afford a very favourite repast. Their killing snakes is doubtless quite fabulous.

The young are born either in June or July, and almost every female brings forth yearly, and often twins. These are always deposited in separate places some distance from each other, the dam keeping herself apart from both, and only visiting to give them suck. Should a young one be caught, its bleating will sometimes bring the old one to the spot; but I never knew an instance of one being seen abroad with its dam, or of two young ones being seen together. Their solitary habits are innate; for if a fawn is taken young and suckled by a sheep or goat, it will not for some time associate with its foster-dam, but, as soon as satisfied with sucking, seeks some spot for concealment. It is amusing to see them suck; all the while they keep leaping up and crossing their fore-legs rapidly over each other. They are rather difficult to rear, as many, soon after they are caught, go blind and die.

In most of the hill-states the musk-deer is considered as royal property. In some, the Rajahs keep men purposely to hunt it; and in Gurwhal a fine is imposed upon any Puharrie who is known to have sold a musk-pod to a stranger—the Rajah receiving them in lieu of rent.

In some districts they are hunted down with dogs, but snaring is by far the most common method practised for their capture. A few are occasionally shot by the village shikaries when in pursuit of other animals; but the matchlock is seldom taken out purposely to hunt musk-deer, for a hill shikarie does not carry the match lighted, and, the deer being generally come upon face to face, almost every one would get away before he could strike a light and apply it to the match. In snaring, a fence about three feet high, composed of bushes and branches of trees, is made in the forest, generally along some ridges, and often upwards of a mile in length. Openings for the deer to pass through are left every ten or fifteen yards, and in each a strong hempen snare is placed, tied to a long stick, the thick end of which is firmly fixed in the ground, and the smaller, to which the snare is fastened, bent forwards to the opening, so that the deer, when passing through, treads upon some small sticks which hold it down, the catch is set free, the stick springs back and tightens the snare round the animal's leg. Besides the musk-deer, numbers of the forest pheasants, moonals, corklass, and argus are caught in these snares; they are visited

every third or fourth day, and it is seldom that the owners return without something or other. The polecats often find out the snares, and, after once tasting the feast, if not destroyed, soon become a terrible annoyance, tracing the fence almost daily from end to end, and seizing on everything caught; they are often caught themselves, but immediately bite the snare in two and escape. Musk-deer are frequently lost to the snarers in this manner; for when one is eaten by the polecats, the pod is torn to pieces, and the contents scattered on the ground. No animal swallows the musk, and when a deer has been killed and eaten by a leopard or other animal, if the ground be carefully examined, much of the musk may be picked up. Insects and maggots also leave it untouched.[1] I once found what I thought was a newly killed musk-deer; but on examination I discovered it was merely the skin and skeleton of one, which from its dry and withered state must have been dead some months; the flesh had been completely eaten away by maggots, but the musk-pod was entire.

The musk-pods which reach the market through the hands of the native hunters are generally enclosed in a portion of the skin of the animal, with the hair or fur left on it. When they have killed a musk-deer, they cut round the pod, and skin the whole of the belly. The pod comes off attached to the skin, which is then laid with its fleshy side on a flat stone previously heated in the fire, and thus dried without singeing the hair. The skin shrinks up from the heat into a small compass, and is then tied or stitched round the pod, and hung up in a dry place until quite hard. This is the general method of preparing them; but some put the pod into hot oil instead of laying it on a hot stone; but either method must deteriorate the quality of the musk, as it gets either completely baked or fried. It is best both in appearance and smell if the pod is at once cut from the skin, and allowed to dry of itself.

The musk received from the Puharries is greatly adulterated, and pods are often made altogether counterfeit; and, as they are generally sold without being cut open, it is scarcely possible to detect the imposture at the time. I have often seen pods offered for sale which were merely a piece of musk-deer skin filled with some substance, and tied up to resemble a musk-pod, with a little musk rubbed over to make it smell. These are easy to detect, from there being no navel on the skin, it being

[1] [Having to do with musk for more than twenty-five years, I never but once saw a living thing in it; however, in May 1861, I purchased six caddies of musk; they were examined and appeared to be all right: in the following August, on opening one of these caddies, I was surprised to find every pod of musk perforated with maggot holes, and, on opening the pods, white maggots, all alive and fat, were found in endless numbers enjoying their banquet—a food which had cost me 50*s.* an ounce. As the creature was new to me, I called it *the Musk Grub.*—S. P.]

cut from any part of the body. But the musk is sometimes taken out of real pods, and its place supplied by some other substance, and these are difficult to detect even if cut open, as whatever is put in is made to resemble musk in appearance, and a little genuine added makes it smell nearly as strong. Some have only a portion of the musk taken out, and its place thus supplied; and others have all the musk left in, but something added to increase the weight. Even in the hills where it is produced, so little do the generality of the people know of musk, that I have often seen the Puharries about Gangoutrie sell to pilgrims, to men from the lower hills, and even to their own neighbours, small portions of what they called musk, but what was merely some substance resembling it, with a little genuine musk scattered over it. Of this stuff they would sell about a quarter of a tolah for a rupee, or about 20*s.* an ounce.

The substances commonly used for adulteration or to fill the counterfeit pods, are blood, boiled or baked on the fire, then dried, beaten to powder, kneaded into a paste, and made into grains and coarse powder to resemble genuine musk; a piece of the liver or spleen prepared in the same manner; dried gall, and a particular part of the bark of the apricot-tree, pounded and kneaded as above. The dried paste from which common oil has been extracted, called 'peena,' is also used, and lumps of this are often, without further preparation, thrust into a pod through the orifice in the skin, to increase the weight. Sometimes no care is taken to give the material employed in filling a counterfeit pod even the appearance of musk. A gentleman once showed me a pod he had bought from a Puharrie at Missourie; on my telling him it was counterfeit, he cut it open, and found it filled with hookah tobacco.[1]

My friend Mr. F. Peake, of the firm Peake, Allen, and Co., of Umballa, and Albion Place, London, whose long residence in the north of India has given him, for a European, unusual opportunities of ascertaining facts relating to the musk-deer, has sent me a skin which I have had mounted by Mr. Ward. This specimen is to be seen at 2 New Bond Street; and in honour thereof my firm adopted the trade-mark of the musk-deer.

Mr. Peake writes:—

The specimen probably will serve to clear up many points relative

[1] Col. Fred. Markham's (C.B.) *Journal of Sporting Adventures and Travel in Chinese Tartary and Thibet.*

to the quality and appearance of musk, and to explain the difference, and cause of there being so many varieties and qualities in the market.

The deer is about the size of a greyhound, and, from the length of its tusks, it is no doubt five or six years of age, or perhaps more. Its brown stubby coat more resembles small porcupine-quills than hair, and every part of the animal has a strong odour of musk. The head, legs, feet, and general outline, are those of the common deer; but in its habits it more resembles the hare, selecting a solitary place or form separate from its species. It is sometimes found in the lower ranges of the mountains, at an elevation of 7,000 to 8,000 feet. It is an inhabitant of the forest, but partial to woody ravines, and is common only on the spurs or projecting points jutting from the eternal snowy ranges, at an altitude of from 10,000 to 14,000 feet.

The natives take the musk-deer by snaring, but this specimen was, it is believed, shot by the rifle. On being approached, they bound off with



great rapidity, and when at about eighty to one hundred yards, turn round for a few seconds to gaze on their disturber with their faces towards him; at this instant the unerring aim is taken, but the prize is not always secured, as sometimes it falls down precipices where it cannot be reached. Days and days are frequently lost without falling in with any, and, on an average, upwards of thirty miles are traversed daily.

The toil of getting up and down these immense mountains is very great, and the pursuit is attended with many hardships and privations. The time expended and distance traversed render the occupation very expensive, from the necessity of being accompanied by various grades of servants, some to hunt up and look out for game, others to carry provisions, cooking utensils, &c.; consequently, genuine musk must always maintain a high rate.

It will be seen that there is a thin membrane under the outer skin of the abdomen, of a small bladder-like appearance, containing a thickish soft substance, which is the musk. The musk in each membranous pod

usually weighs from two drachms to an ounce; from an old deer, from one ounce and a half to two ounces; and its odour increases in proportion to the age of the animal. The male only furnishes the musk; at the age of twelve months and under it does not yield any, and it is only at three years that the pod contains sufficient to be worth the trouble of extracting. The practised eye can generally judge if it be a young one—if so, it is allowed to escape. At two years the pod contains a yellowish milky substance, and when first changed to musk, it yields not more than two drachms, frequently less.

A few extracts from our Himalayan correspondent's letter may more clearly illustrate its character:—

One or two small parcels I have sent to London have had a preference in the market even to the best Assam. About sending it in pods with the hair on? I will do so if you like; but I would not recommend it, as my musk is genuine just as it is taken from the animal. The thin bladder-like skin dries in the sun in a few hours—that in the hairy pods, on the contrary, gets quite roasted in the process of preserving and preparing.

The native plan is to make a stone nearly red hot, and the pod is first applied to it inwardly and outwardly till the skin is nearly dry, when it is stitched up, and the navel side is then held to the stone, pressing it and closing it with considerable force till the pod is quite dry. If this were not done, putrefaction would ensue, which, though only of the skin, would not improve the musk.

I sent both kinds home, to ascertain which was best, and that in the pods without the hairy skin was declared to be far superior. All came from the same place, and from animals killed the same season.

In a letter of a former year he states:—

I send you an account of the season's produce, viz. 120 pods, which weigh about 110 to 120 ounces or more, as they are large. The small ones being nearly all skin, I thought it advisable to let the natives have them to dress in their way and to sell to natives.

The musk-pod familiar to us all is this membranous bladder, cut from the deer with a portion of the outer skin; it is pressed and stitched up, and dried on a hot stone. By this continued heat much of its odour is driven off, and it is consequently deprived of its qualities as a remedial agent, and for the use of the perfumer greatly deteriorated. A large quantity of musk collected by natives, which is invariably falsified, finds

its way to this and other countries. They cut the young pods, containing no musk at all, as before mentioned, and fill them with the liver and blood of the animal, mixed with this yellow fluid and a small portion of genuine musk, fill, and sew them up in the skin, and dry on the hot stove; or those which yield half a drachm to a drachm they mix and dry in like manner.

At one of the Government sales in India of presents given by native princes, there were many pods of musk, to appearance very fine, which proved to be nearly worthless; they had evidently been 'made up,' and from long keeping the little real musk they contained had considerably evaporated.

It would be a difficult matter for a native to resist the temptation of not making some addition even to the finest pods, or of extracting a portion and filling it up with the mixture of blood and liver.

The interior of the Himalayas where the supply is obtained is towards Ladâk, Thibet, and Chinese Tartary; and, as these mountains extend over so many thousand miles, it is probable that the musks known as China, Nepaul, and other musks, and perhaps some Russian, are from the same districts. The Tartar tribes wander from place to place, bartering with the natives of these several countries who have access to these regions. Hence the musk would be from the same species, the difference in appearance being caused by its varying age and mode of preparing and drying.

The genuineness of musk depends on the honesty of the natives and others who procure and dispose of it to the various markets.

The musk in the membranous bladder yields nearly double the quantity of grain musk to an equal weight of musk with the skin and hair.

It is a fashion of the present day for people to say that 'they do not like musk;' but, nevertheless, from great experience in one of the largest manufacturing perfumatories in Europe, I am of opinion that the public taste for musk is as great as any perfumer desires. Those substances containing it always take the preference in ready sale—so long as the vendor takes care to assure his customer 'that there is no musk in it.'

The Empress Josephine was very fond of perfume, and, above all, of musk. Her dressing-room was filled with it, in spite of Napoleon's frequent remonstrances.

Forty years have elapsed since her death, and the present owner of Malmaison has had the walls of that dressing-room repeatedly washed and painted; but neither scrubbing, aquafortis, nor paint has been able to remove the smell of the good Empress's musk, which continues as strong as if the bottle which contained it had been but yesterday removed.

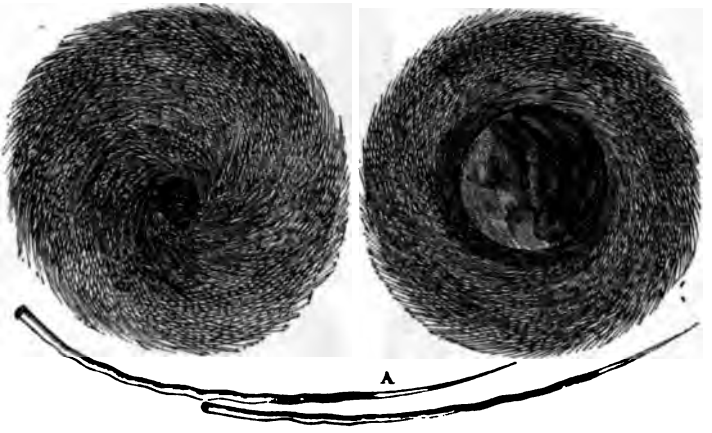
Such is the story which makes its periodical appearance, with others, when printers want matter to 'make up' a column of a magazine of *Fiction!* This story will remind readers of another but rather more truthful—that of an extravagant Turk, who built a harem and had the cement of its walls mixed with musk which is fragrant to this day. [I do not know when the building was erected.] There is yet one more tale of this oft repeated fable, which is to be read in modern Cyclopedias and allied works, which runs somewhat thus: 'A grain of musk will perfume an apartment for a whole year without sensibly losing weight!' The longevity of the smell of musk undoubtedly under certain conditions of seclusion from the outward air is great; but it is not of that mythical character with which the late Sir G. C. Lewis endowed the old lady whom he never could make out, who lived longer than the lease of a plot of building land, namely, ninety-nine years. A grain of musk will *not* perfume an ordinary sized 'apartment,' say even a small one of ten feet square, for one week! Musk rapidly loses weight and odour when exposed to ordinary currents of air; the odorous particles are dissipated, and there is left, if the experiment be tried upon glass or card, an odourless brown patch as one would notice from a speck of animal blood or excreta, the fragrance of the musk is gone; the fable verifies its lasting odorous qualities, but, like a flatterer, it tells of qualities which will not bear the test of experiment.

The perfumer uses musk principally in the scenting of soap, sachet-powder, and in mixing for liquid perfumery. The just reputation of Paris's original Windsor soap is due, in

the main, to its delightful odour. The soap is, doubtless, of the finest quality, but its perfume stamps it among the *élite*—its fragrance it owes to musk.

The alkaline reaction of soap is favourable to the development of the odoriferous principle of musk. If, however, a strong solution of potass be poured on to grain musk, ammonia is developed instead of the true musk smell.

The musk-pods of commerce vary in form according to their origin. We give some of the most usual forms.



MUSK-PODS OF BENGAL, UPPER AND LOWER SURFACES.

A, hairs of the pods, natural size.

There are three kinds of musk common in the London market. The *Cabardien*, or *Russian Musk*, which is rarely, if ever, adulterated; from its poor fragrance, however, it does not fetch more than 8*s.* an ounce in the pod. The *Assam Musk* is next in quality; it is very strong, but has a rank smell; the pods are very large and irregular in shape; fetches about 24*s.* per ounce in the pod. The *Tonquin* or *Chinese Musk* yields the kind mostly prized in England, and

is more adulterated than the former: market price, from 26*s.* to 32*s.* per ounce in the pod.

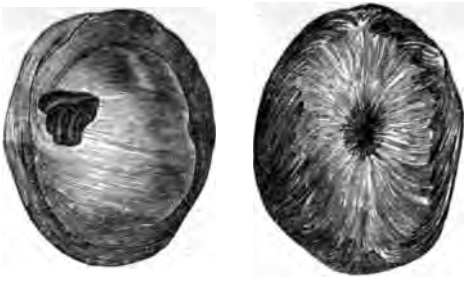
Extract of Musk.

Grain musk	2 oz.
Rectified spirit	1 gallon

After standing for one month, at a summer temperature, it is fit to draw off. Such an extract is that which is used for



CABARDIEN, OR RUSSIAN MUSK-PODS.



MUSK-PODS OF CHINA. OPPOSITE SIDES.

mixing in other perfumes. That extract of musk which is prepared for retail sale is made thus: and sold under the title of

Extrait de Musc.

Extract of musk	1 pint
„ ambergris	½ „
„ rose triple	¼ „

Mix and filter; it is then fit for bottling.

This preparation is sweeter than pure extract of musk made according to our first formula, and is also more profitable to the vendor. It will be seen hereafter that the original extract of musk is principally used for a fixing ingredient in other perfumes, to give permanence to a volatile odour; customers requiring, in a general way, that which is incompatible—namely, that a perfume shall be strong to smell, *i.e.*



very volatile ; and that it shall remain upon the handkerchief for a long period, *ergo* not volatile! Small portions of extract of musk, mixed with esprit de rose, violet, tubereuse, and others, do, in a measure, attain this object ; that is, after the violet, &c., has evaporated, the handkerchief still retains an odour, which, although not that of the original smell, yet gives satisfaction, because it is pleasant to the nasal organ.

In the caddies of Chinese musk which are imported into this country, there are occasionally found the musk merchants' circulars, or, as they are called, 'chop-papers,' and also, though rarely, a quaint print representing the capture of the animal. Rudely executed as these prints are, they nevertheless teach us something relating to the methods of obtaining this nasal



luxury; the above engravings are 'highly finished' copies of an original pair which came together in the same caddy: they show the huntsmen on horseback, the dogs, the bowmen, the arrow-stricken animal, the return of the hunting party, and the 'game' suspended on the poles to its last home,—in fact, the whole story is thus told better than words can express.

I am indebted to Mr. Smith, of the firm of Smith and Elder, of Cornhill, for the following translation of the accompanying 'chop-paper,' which was found on opening an original caddy

of musk, of superior quality: by this it would appear that the finest musk in Chinese estimation is from Thibet and from the province of Ta-tseen-loo; it also mentions the principal towns where it is sent for sale.

Translation of Chop-paper.

Our firm itself selects the best kind of superior Sze-chuen musk at Ta-tseen-loo, in that province, and in Thibet, from whence we send it, without any admixture, to Soo-chow, Nanking, Hwae-chow, Yang-chow,



and Kwang-tung, for sale. Our wares are genuine, our prices true, and neither old nor young are deceived in them. We beg honourable merchants, who may favour us with their custom, to remember our firm seal, certain shameless scoundrels having falsely assumed our designation, and fraudulently issued notices in order to deceive merchants. Fearing that it may be difficult to distinguish in this confusion, we now, in Kwang-tung, notify the selected designation of our firm, as a rule for guidance.

The Kwang-shun-se-ke, firm of Sze-chuen.

In commerce musk is supplied in two ways—in bladders or

in bags; that is to say, contained in the glandular apparatus which produces it, and separate from the bladder, or in grains. The first is most valued. The chief varieties are the Tonquin, Chinese or Thibetan musk, and the Kabardin or musk of Siberia. These divisions might be multiplied. The Thibetan and Tonquin musk, as well as that from the western provinces of China, reaches Europe by way of Canton, and is brought by English and Dutch ships. It is packed in cases of small size, protected on the outside by plates of lead soldered together. Each case contains about twenty-five bags, each of which is wrapped in very fine paper, bearing figures and inscriptions indicating the contents.

The China musk, the most valued, bears on the wrapper, in red or blue letters and in English, the inscription,—*Musk collected at Nankin by Tungt-chin Chung Chang Ké.* Beneath is the figure of a Chinese divinity, with a musk-deer at his feet, and a streamer on which the good quality of the article is set forth. On the lid are the words *Ling Tchan Musk*, and below is a coarse drawing representing the chase of the musk-deer, from the belly of which hangs a bag of musk.

The musk of Assam, south of Thibet, reaches Europe by way of Calcutta. It is sent in bags enclosed in a chest of wood or tin-plate, which holds about two hundred pods. The form of this musk is more variable than that of the Nankin musk.

The Kabardin or Siberian musk comes from the Altai mountains and other parts of northern Asia. It is sent by way of the Baltic; the pods are smaller, the hair of the under surface is silvery grey, the colour of the musk is darker, it is of a clear chocolate tint, drier and less scented, and its odour is not so agreeable.

Musk must have been greatly valued at the epoch of the Crusades, for it figures among the precious objects sent by Sultan Saladin to the Greek emperor of Constantinople: it

was an ingredient in a large number of pharmaceutical preparations; and it was employed at the toilet and in embalming.

Nothing is known as to the physiological action of the musk-bag and of the substance contained in it. All that is known is that the secretion is most abundant at the period of rutting, and this circumstance naturally suggests that it may play a certain part in the reproductive process of the animals.

It has been ascertained by Brandt that the male musk-bearers have, about the middle of the external surface of the thigh, a subcutaneous gland composed of aveolar cells which secrete a greenish, syrupy, colourless matter, the use of which is not known.

The odour of musk is more or less modified by its association with various odorous or inodorous substances. Thus, camphor and valerian affect it, and bitter almonds destroy it. When perfumers have to disinfect a mortar that has been used for rubbing musk with other substances, they pound bitter almonds in it.

SECTION VII.

AMMONIA.—Under the various titles of 'Smelling Salts,' 'Preston Salts,' 'Inexhaustible Salts,' 'Eau de Luce,' 'Sal Volatile,' ammonia, mixed with other odoriferous bodies, has been very extensively consumed as material for gratifying the olfactory nerve.

The perfumer uses Liq. Amm. fortis—that is, strong liquid ammonia—and the sesqui-carbonate of ammonia, for preparing the various 'salts' that he sells. These materials he does not attempt to make; in fact, it is quite out of his province so to do, but he procures them ready for his hand through some manufacturing chemist. The best preparation for smelling-bottles is what is termed *Inexhaustible Salts*, which is prepared thus:—

Liquid ammonia	1	pint
Otto of rosemary	1	drachm
„ English lavender	1	„
„ bergamot	½	„
„ cloves	½	„

Mix the whole together with agitation in a very strong and well-stoppered bottle.

This mixture is used by filling the smelling-bottles with any porous absorbent material, such as asbestos, or, what is better, sponge cuttings that have been well beaten, washed, and dried. These cuttings can be procured at a nominal price from any of the sponge-dealers, being the trimming or

roots of the Turkey sponge, which are cut off before the merchants send it into the retail market. After the bottles are filled with the sponge, it is thoroughly saturated with the scented ammonia, but no more is poured in than the sponge will retain when the bottles are inverted; as, if by any chance the ammonia runs out and is spilt over certain coloured fabrics, it causes a stain. When such an accident happens, the person who sold it is invariably blamed.

When the sponge is saturated properly, it will retain the ammoniacal odour longer than any other material; hence, we presume, bottles filled in this way are called 'inexhaustible,' which name, however, they do not sustain more than two or three months with any credit; the warm hand soon dissipates the ammonia under any circumstances, and they require to be refilled.

For transparent coloured bottles, instead of sponge, the perfumers use what they call insoluble crystal salts (sulphate of potass). The bottles being filled with crystals, are covered either with the liquid ammonia, scented as above, or with alcoholic ammonia (alcohol saturated with ammoniacal gas). The necks of the bottles are filled with a piece of white cotton; otherwise, when inverted, from the non-absorbent quality of the crystals, the ammonia runs out, and causes complaints to be made. The crystals are prettier in coloured bottles than the sponge; but in plain bottles the sponge appears quite as handsome, and, as before observed, it holds the ammonia better than any other material. Perfumers sell also what is called *White Smelling Salts*, and *Preston Salts*. The White Smelling Salt is the sesqui-carbonate of ammonia in powder, with which is mixed any perfuming otto that is thought fit, —lavender otto giving, as a general rule, the most satisfaction.

The contents of a bottle so filled soon lose their pungency, and a nearly inodorous residue remains. Mr. Allchin's plan

is first of all to convert the sesqui-carbonate into the mono-carbonate of ammonia, which is accomplished in the following way:—Forty ounces of sesqui-carbonate of ammonia are broken into fragments about the size of filberts, and placed in a jar having a well-fitting lid. Into this is afterwards poured twenty ounces of liquor ammonia, sp. gr. 880°. This mixture is frequently stirred for a week, and the jar is then set aside in a cool place for three or four more weeks. If the mixture is not stirred for the first week it sets as hard as a stone; but after stirring, it becomes solid and dry, but can be easily removed from the jar. It is now reduced to a roughish powder, something like salt of tartar, and in that state it is ready for filling the bottles, and improves by keeping. When placed in the bottles, some volatile essence or strong ammonia perfumed with essential oils is added. The volatile essence Mr. Allchin uses and recommends is the first given in Dr. Redwood's edition of 'Gray's Supplement to the Pharmacopœia,' and is as follows:—

English oil of lavender and essence of musk, of each	4 drachms
Oil of bergamot	2 „
„ cloves	1 drachm
Otto of roses	10 drops
Oil of cinnamon	5 „
Strongest liquor ammonia	1 pint

In the above way, a salt is made which retains its pungency as long as any remains in the bottle. One that had been filled five years was exhibited to a meeting of the Pharmaceutical Society, and, although nearly all the contents had evaporated, what remained still possessed a pungent, agreeable odour.

It was noticed that the salt had become of a brownish colour, which was attributed to the action of the oil of cloves

contained in the perfume, and it was stated that it would remain colourless if it were omitted.

We may remark that the proto-carbonate of ammonia does not exist in a free and pure state. It may be allowed that the sesqui-carbonate results from the combination of a bi-carbonate with a neutral carbonate, and by adding ammonia to this mixture, a basic carbonate is obtained. This, however, is of little consequence as regards the applications of these salts by the perfumer.

PRESTON SALT, which is the cheapest of all the ammoniacal compounds, is composed of some easily decomposable salt of ammonia and lime, such as equal parts of ammonia chloride, or of sesqui-carbonate of ammonia, and of fresh-slaked lime. When the bottles are filled with this compound, rammed in very hard, a drop or two of some cheap otto is poured on the top prior to corking. For this purpose otto of French lavender, or otto of bergamot, answers very well. We need scarcely mention that the corks are dipped into melted sealing-wax, or brushed over with liquid wax—that is, red or black wax dissolved in alcohol—to which a small portion of ether is added. The only other compound of ammonia that is sold in the perfumery trade is eau de Luce, though properly it belongs to the druggist. When correctly made—which is very rarely the case—it retains the remarkable odour of oil of amber, which renders it characteristic.

Eau de Luce.

Tincture of benzoin; or, ...	1 oz.
„ balsam of Peru	
Otto of lavender	10 drops
Oil of amber	5 „
Liquor ammonia	2 oz.

If requisite, strain through cotton wool; but it must not be filtered, as it should have the appearance of a milk-white emulsion.

There are several formulæ for the preparation of eau de Luce. The following is the most usual in France:—

Rectified oil of amber	2 grammes
White soap	1 gramme
Balsam of Peru	1 „
Spirit of wine at 86°	96 grammes

Macerate for eight days, then filter. To prepare eau de Luce add one part of the above tincture to sixteen parts of fluid ammonia.

Soap is not an ingredient in all the formulæ of eau de Luce; but it imparts more stability to the milky mixture.

SNUFF.

Though we advocate the proper use of the olfactory sense, yet we repudiate snuff; nevertheless, we cannot allow this work to go to press without pointing out the analogy between the use of scent and the use of snuff. By a singular perversity of human nature, the snuff-takers declare, almost to the majority of one, that they dislike scent: we have, however, only to show that snuff is scent in a high degree, and then leave the reader to decide the question.

Two-thirds of the snuff that is taken owes its fragrance to ammonia, the tobacco-leaf merely serving as a medium to bring the ammonia to the nose. The moist tobacco-leaf certainly imparts a peculiar odour to the snuff that is made from it, but still it is to the ammonia that it owes its peculiar pungency. In this respect, then, we can only compare the snuff-box to the ladies' smelling-bottle; they are both mediums for conveying ammonia, either plain or modified by certain other odorous bodies for the purpose of disguising its real smell, to the olfactory nerve.

The reader will now see our reason for placing snuff in the same section of odoriferous bodies as 'smelling salt.'

Like every other substance that is capable of being modified by man, there are snuffs in infinite variety.

The plain snuffs are of two kinds; that is, Scotch and Rappee. Irish is but a slight modification of Scotch. The Irish and Scotch snuffs are made from the stalks of the tobacco-leaf, which, in truth, otherwise would be a waste product of cigar manufacture. When the tobacco-leaf is being made into cigars, the stalks and fibres are cut out of the leaf, otherwise it would not roll up properly; when these fibres have accumulated sufficiently, the snuff-making process is begun. If the snuff is to become any of the high-dried qualities, then the material has to be sent to an oven, and there dried to that extent required for particular denominations. Lundyfoot is remarkable as being dried almost to the extent of burning, hence this favourite 'blackguard' always has a burnt wood smell; after this process it is sent to the snuff-mills, to be ground to titillating dust.

The Irish and common Scotch is made entirely from the stalk of the tobacco-leaf. The *best* Scotch contains a portion of the leaf mixed with the stalk. The moist snuffs are prepared in another way, thus:—After sufficient stalks have accumulated in the manufactory, they are cut up into pieces of about the $\frac{1}{16}$th to $\frac{1}{8}$th of an inch in length, and placed in a large trough, in lots of from one hundredweight to double that quantity. As the material is put in, it is thoroughly moistened with water in which is dissolved, for some varieties, carbonate of ammonia, and for others, muriate of ammonia: in this state it is left to ferment or ripen from about one to two months, according to the weather; in a fortnight or more after this treatment, the material begins to 'heat,' and it is now that the future aroma, or *flavour*, as the makers term it, is decided; for if it becomes too hot, the ammonia is dissipated, and if not hot enough, then the ammoniacal fragrance is not sufficiently developed. It must be observed that

tobacco in any form, when moist, and allowed to heat, *produces ammonia* from the elements of its own composition; in this respect it is only like other vegetables containing nitrogenous compounds; the final odour of the snuff depends on the peculiarities of the various tobaccos employed, such as American, Cuban, &c. After the fermentation is complete, the material is sent to the mill to be ground.

'Rappee,' which means little leaf, is considered a finer quality of snuff than the former, and is prepared by a similar process; it consists, however, of leaf tobacco, and contains little or no stalk. The ammoniacal smell is much stronger in rappee snuff than in others.

There are, however, several other kinds of snuff, which for their popularity will induce us to claim all who use them—and they are a legion—as patrons of the 'Art of Perfumery.' These are 'Prince's Mixture,' which is a rappee scented with otto of rose; and 'Queen's Scotch,' which is perfumed with bergamot.

The snuff-makers were the first to teach the perfumers to what an extent the fragrance of the Tonquin Bean was admired; even now, if a perfumer makes a mixture containing Tonquin Bean extract in excess, he is charged with making his perfumery smell like snuff.

One of the most delightfully scented snuffs, called 'Wallflower,' is made by Messrs. G. and S. Goodes, of Spitalfields, who seem determined, in spite of public opinion, to bring snuff into fashion as it was in the reign of Good Queen Anne.

Dr. Revil says:—

> The French snuffs, prepared in a different manner from the English, are highly thought of by foreigners, and are frequently preferred to the noted snuffs of Spain. We hold, in opposition to Dr. Piesse's opinion, that the action of snuff is not owing merely to the ammonia disengaged from it.

The odour of snuffs is to be distinguished from their

strength or perfume. The flavour reveals itself in the odour, the strength in the after effects of the snuff. The latter is due to the nicotine. A tobacco is high perfumed when it contains salts of ammonia, and little strength when nicotine is present in small quantity. It is just the reverse in the case of Virginia, which contains only a small quantity of ammonia and has little flavour ; but it is very strong because it contains a good deal of nicotine. The latter escapes the sense of smell, and only shows itself by absorption by the mucous membrane of the nose.

It is probable that the *perfume* is independent of the nicotine and the ammonia. By this term is denoted the sweet odour characteristic of the tobaccos of Virginia. It is chiefly developed during the fermentation of the mass.

At the present time the soaking necessary to set up fermentation is effected with salt water. Formerly, various liquids, under the name of sauces, were employed, either to promote fermentation or to aromatise. These sauces varied with the various works: sometimes molasses dissolved in water was used; or a solution of liquorice juice; water in which raisins or prunes had been boiled; rose-water and violet-water. Particular scents used to be given to tobaccos, which were then called by specific names, for example, *scaferlati, Levantine, Canaster, Saint Vincent's twist*, or *American grasshopper, roll of Montauban, Brazilian bouquet*, &c. The *Macoaba* was imitated with a decoction of iris of Florence, while the true Macoaba is a tobacco prepared at Martinique, with a solution of raw sugar, which imparts to it the odour of violet. These sauces are still used in the manufacture of Havana and Malaisie. It is stated by Prade[1] that infusion of melilot was employed for aromatising tobacco, and decoctions of India wood and cinnamon for colouring it. Moreover, the nature of the perfumes differed in the different manufactories ;

[1] *Histoire du Tabac*, p. 16, Paris, 1691.

they were orange-flower, jasmine, rose, tubereuse, amber, musk, civet, or essences agreeable to the sense of smell. But now snuff is manufactured to a great extent without aromatics, and the takers perfume it to their own taste, most frequently with the Tonka bean.

From these various ways of perfuming snuff arose as many different kinds, which were named snuff of *mille fleurs*, of Spain, of cedrat, of bergamot, of neroli, of *pongibon musqué*, à la pointe d'Espagne, with odour of Rome, with odour of Malta ambered, Genoese. Hence originated many frauds; *e.g.* under the name of Malta snuff a mixture was sold of which the ingredients were rose-wood and liquorice powders.

Attempts were also made to increase the strength of snuffs by mixing certain powders with them. Thus there were snuffs compounded with eye-bright, hetony, pyrethrum, cyclamen, angelica, ginger, pepper, clove, cubeb, cumin, mustard, hellebore, euphorbia, &c. But all these have now fallen into disuse.

There were also tobaccos compounded and aromatised with anise, fennel, aloes wood, iris, sage, and rosemary mixed with them. At the present time hardly anything is used but cascarilla bark.

Real amateurs say that the aroma of cigars is as diversified as the bouquet of wines. The selection of tobaccos and the mode of fermentation may doubtless have much to do with the various scents of cigars; but nothing is positively known on the subject. The taste of cigars has been compared to that of cacao, burnt coffee, bitter almonds, the hazel nut, wormwood, &c. The Cuban manufacturers at the present time perfume them with various aromatic plants, by enclosing them in cases of sweet-smelling wood, such as the juniper-tree of the Bermudas or of Virginia (*Juniperus bermudiania* or *J. virginiana*). But the probability is that the particular soil, the climate and the mode of cultivation may each have

an influence on the formation of the essential oils which help to impart the aroma to cigars. The same may be said with respect to more or less advanced stages of fermentation; as a general rule, a too energetic fermentation is injurious to the qualities of tobacco. Some makers assert that certain liquids promote the development of the aroma; such, for instance, as beer or coffee with water.

All that is necessary for scenting cigars is to enclose them in cases or in jars with the scent which is to be imparted. As they are very porous and permeable, they are easily impregnated with it, and will retain it a long time. Patchouly leaves very quickly impart in this way the qualities of age.

ACETIC ACID AND ITS USE IN PERFUMERY.

The pungency of the odour of vinegar naturally brought it into the earliest use in the art of perfumery.

The acetic acid evolved by distilling acetate of copper (verdigris) is the true 'aromatic' vinegar of the old alchemists.

The modern aromatic vinegar is the concentrated acetic acid aromatised with various ottos, camphor, &c., thus :—

Aromatic Vinegar.

Concentrated acetic acid	8 oz.
Otto of English lavender	2 drachms
„ „ rosemary	1 drachm
„ cloves	1 „
„ camphor	1 oz.

First dissolve the bruised camphor in the acetic acid, then add the perfumes; after remaining together for a few days, with occasional agitation, it is to be strained, and is then ready for use.

Several forms for the preparation of this substance have been published, almost all of which, however, appear to complicate and mystify a process that is all simplicity.

The most popular article of this kind is—

Henry's Vinegar.

Dried leaves of rosemary, rue, wormwood, sage, mint, and lavender flowers, each	½ oz.
Bruised nutmeg, cloves, angelica root, and camphor, each	¼ „
Alcohol (rectified)	4 „
Concentrated acetic acid	16 „

Macerate the materials for a day in the spirit; then add the acid, and digest for a week longer, at a temperature of about 14 C. or 15 C. Finally, press out the now aromatised acid, and filter it.

As this mixture must not go into the ordinary metallic tincture-press, for the obvious reason of the chemical action that would ensue, it is best to drain as much of the liquor away as we can, by means of a common funnel, and then to save the residue from the interstices of the herbs, by tying them up in a linen cloth, and subjecting them to pressure, by means of an ordinary lemon-squeezer or similar apparatus.

Vinaigre à la Rose.

Concentrated acetic acid	1 oz.
Otto of roses	½ drachm

Well shaken together.

It is obvious that vinegars differently perfumed may be made in a similar manner to the above by using other ottos in place of the otto of roses. All these concentrated vinegars are used in the same way as perfumed ammonia—that is, by pouring three or four drachms into an ornamental 'smelling' bottle, previously filled with crystals of sulphate of potash, which forms the 'sel de vinaigre' of the shops; or upon sponge into little silver boxes, called vinaigrettes from their French origin. The use of these vinegars had their origin in the presumption of keeping those who carried them from the

effects of infectious disease, doubtless springing out of the story of the 'four thieves' vinegar,' which is thus rendered in Lewis's 'Dispensatory':—

It is said that during the plague at Marseilles[1] four persons, by the use of this preservative, attended unhurt multitudes of those that were affected; that, under the colour of these services, they robbed both the sick and the dead; and that, being afterwards apprehended, one of them saved himself from the gallows by disclosing the composition of the prophylactic,[2] which was as follows:—

Vinaigre des Quatre Voleurs, or Four Thieves' Vinegar.

Take fresh tops of common wormwood, Roman wormwood, rosemary, sage, mint, and rue, of each	¾ oz.
Lavender flowers	1 „
Garlic, calamus aromaticus, cinnamon, cloves, and nutmeg, each	1 drachm
Camphor	½ oz.
Alcohol, or brandy	1 „
Strong vinegar	4 pints

Digest all the materials, except the camphor and spirit, in a closely covered vessel, for a fortnight, at a summer heat; then express and filter the vinaigre produced, and add the camphor previously dissolved in the brandy or spirit.

A very similar and quite as effective a preparation may be made by dissolving the odorous principle of the plants indicated, in a mixture of alcohol and acetic acid. Such preparations, however, are more within the province of the druggist than the perfumer. There are, however, several preparations of vinegar which are sold to some extent for mixing with the water for lavatory purposes and the bath, their vendors endeavouring to place them in competition with eau de Cologne, but with little avail. Among them may be enumerated—

[1] To any one who travels its undrained streets, some of which are but open sewers, the wonder is that there is not always a plague there.

[2] A very likely story!

Hygienic or Preventive Vinegar.

Brandy	1 pint
Otto of cloves	1 drachm
„ lavender	1 „
„ marjoram	½ „
Gum benzoin	1 oz.

Macerate these together for a few hours, then add—

Brown vinegar	2 pints

And strain or filter, if requisite to be bright.

Toilet Vinegar (à la Violette).

Extract of cassie	½ pint
„ orris	¼ „
Esprit de rose triple	¼ „
White wine vinegar	2 pints

Toilet Vinegar (à la Rose).

Dried rose-leaves	4 oz.
Esprit de rose triple	½ pint
White wine vinegar	2 pints

Macerate in a close vessel for a fortnight, then filter and bottle.

Vinaigre de Cologne.

To eau de Cologne	1 pint
Add strong acetic acid	½ oz.

Piesse and Lubin's Cosmetic Vinegar.

Spirit	1 quart
Gum benzoin	3 oz.
Concentrated aromatic vinegar	1 „
Balsam of Peru	1 „
Otto of neroli	1 drachm
„ of nutmeg	½ „

This is one of the best that is made.

Without unnecessarily repeating similar formulæ, it will be obvious to the reader that vinegar of any flower may be prepared in a similar way to those above noticed; thus, for vinaigre à la jasmin, or for vinaigre à la fleur d'orange, we

have only to substitute the esprit de jasmin, or the esprit de fleur d'orange, in place of the eau de Cologne, to produce orange-flower or jasmine vinegars; however, these latter articles are not in demand, and our only reason for explaining how such preparations may be made, is in order to suggest the methods of procedure to any one desirous of making them leading articles in their trade.

We perhaps may observe, *en passant*, that where economy in the production of any of the toilet vinegars is a matter of consideration, they have only to be diluted with rose-water down to the profitable strength required.

Any of the perfumed vinegars that are required to produce opalescence when mixed with water must contain some gum-resin, like the hygienic vinegar, as above. Either myrrh, benzoin, storax, or tolu answer equally well.

Acetic acid obtained by the distillation of wood is often substituted by the perfumer for that obtained from verdigris. It is, indeed, preferred when perfectly rectified, *i.e.* freed from empyreumatic substances. The former invariably contains *pyro acetic spirit*, or *acetone*, the tarry smell of which becomes obvious when the acid is saturated with an alkaline carbonate.

Lastly, by distillation of vinegar of wine, a very concentrated acetic acid, and highly valued, is obtained. It may be recognised by its exceedingly pleasant odour of acetic ether, which becomes very perceptible when it is saturated with an alkaline carbonate.

SECTION VIII.

BOUQUETS AND NOSEGAYS.

See, from bright regions, borne on odorous gales,
The swallow, herald of the summer, sails.
Breathe, gentle air! From flower-cups impart
Thy balmy influence to my anguish'd heart;
Thou whose soft voice calls forth the tender blooms,
Whose pencil paints them, and whose breath perfumes:
O may each bud that decks the brow of Spring
Shed all its incense on thy wafting wing!

IN the previous articles we have endeavoured to explain the mode of preparing the primitive perfumes—the original odours of plants. It will have been observed that, while the majority can be obtained under the form of otto, or essential oil, there are others which hitherto have not been isolated, but exist only in solution in alcohol, or in a fatty body. Of the latter are included all that are most prized, with the exception of otto of rose—that diamond among the odoriferous gems. Practically, we have no essential oils or ottos of Jasmine, Vanilla, Acacia, Tubereuse, Cassie, Syringa, Violets, and others. What we know of these odours is derived from esprits obtained from oils or fats in which the several flowers have been repeatedly infused, and afterwards infusing such fats or oils in alcohol. Undoubtedly, these odours are the most generally pleasing, while those made from the essential oils (*i.e.* ottos) dissolved in spirit are of a secondary character. The simple odours, when isolated, are called ESSENTIAL OILS, or OTTOS; when dissolved or existing in

solution in alcohol, by the English they are termed ESSENCES, and by the French EXTRAITS, or ESPRITS ; a few exceptions prove this rule. Essential oil of orange peel, and of lemon peel, are frequently termed in the trade 'Essence' of orange and 'Essence' of lemons, instead of essential oil or otto of lemons, &c. The sooner the correct nomenclature is used in perfumery, as well as in the allied arts, the better, and the fewer blunders will be made in the dispensatory. It appears to the writer that, if the nomenclature of these substances were revised, it would be serviceable ; and he would suggest that, as a significant, brief, and comprehensive term, Otto be used as a prefix to denote that such and such a body is the odoriferous principle of the plant. We should then have otto of lavender instead of essential oil of lavender, &c., &c. In this work it will be seen that the writer has generally used the word OTTO in place of 'essential oil,' in accordance with his views. Where there exists a solution of an essential oil in a fat oil, the necessity of some such significant distinction is rendered obvious, for commercially such articles are still called 'oils'—oil of jasmine, oil of roses. &c. It cannot be expected that the public will use the words 'fat' oil and 'essential' oil, to distinguish these differences of composition.

There are several good reasons why the odoriferous principle of plants should not be denominated oils. In the first place, it is a bad principle to give any class of substances the same signification as those belonging to another. Surely, there are enough distinguishing qualities in their composition, their physical character, and chemical reaction, to warrant the application of a significant name to that large class of substances known as the aroma of plants !

When the chemical nomenclature was last revised, the organic bodies were little dealt with. We know that we owe this universal 'oil' to the old alchemist, much in the same way as 'spirit' has been used ; but a little consideration

quickly indicates the folly of its continued use. We can no longer call otto of rosemary, or otto of nutmegs, essential oil of rosemary, or nutmegs, with any more propriety than we can term sulphuric acid 'oil' of vitriol. All the chemical works speak of the odoriferous bodies as 'essential' or 'volatile' oils, and of the greasy bodies as 'fat' or 'unctuous' oils. Oils, properly so called, unite with salifiable bases and form soap; whereas the essential or volatile oils—*i. e.* what we would please to call the ottos—do no such thing. On the contrary, they unite with acids in the majority of instances.

The word 'oil' must hereafter be confined to those bodies to which its literal meaning refers—fat, unctuous, inodorous (when pure), greasy substances—and can no longer be applied to those odoriferous materials which possess qualities diametrically opposite to oil. We have grappled with 'spirit' and fixed its meaning in a chemical sense; we have no longer 'spirit' of salt, or 'spirit' of hartshorn. Let us no longer have almond oil 'essential,' almond oil 'unctuous,' and the like.

It remains only for us to complete the branch of perfumery which relates to odours for the handkerchief, by giving the formulæ for preparing the most favourite 'bouquets' and 'nosegays.' These, as before stated, are but mixtures of the simple ottos in spirit, which, properly blended, produce an agreeable and characteristic odour—an effect upon the smelling nerve similar to that which music or the mixture of harmonious sounds produces upon the nerve of hearing, that of pleasure.

THE ALHAMBRA PERFUME.

Extract of	tubereuse	1 pint
„	geranium.	½ „
„	acacia	¼ „
„	fleur d'orange	1 „
„	civet	¼ „

THE BOSPHORUS BOUQUET.

Extract of acacia		1 pint
„ jasmine „ rose triple „ fleur d'orange „ tubereuse	of each	½ „
„ civet		¼ „
Otto of almonds		10 drops

BOUQUET D'AMOUR.

Esprit de rose „ jasmin „ violette „ cassie	from pomade of each	1 pint
Extract of musk „ ambergris	of each	½ „

Mix and filter.

BOUQUET DES FLEURS DU VAL D'ANDORRE.

Extrait de jasmin „ rose „ violette „ tubereuse	from pomade of each	1 pint
Extract of orris		1 „
Otto of geranium		¼ oz.

BUCKINGHAM PALACE BOUQUET.

Extrait de fleur d'orange „ cassie „ jasmin „ rose	from pomade of each	1 pint
Extract of orris „ ambergris	of each	½ „
Otto of neroli		½ drachm
„ lavender		½ „
„ rose		1 „

BOUQUET DE CAROLINE ; also called BOUQUET DES DÉLICES.

Extrait de rose	from pomade of each	1 pint
„ violette		
„ tubereuse		
Extract of orris	of each	½ „
„ ambergris		
Otto of bergamot		¼ oz.
Citron zeste		½ „

THE COURT NOSEGAY.

Extrait de rose	of each	1 pint
„ violette		
„ jasmin		
Esprit de rose triple		1 „
Extract of musk	of each	1 oz.
„ ambergris		
Otto citron zeste	of each	½ „
„ bergamot		
„ neroli		1 drachm

EAU DE CHYPRE.

This perfume is presumed to be derived from the *Cyperus esculentus* by some, and by others to be so named after the Island of Cyprus. During the national career of Egypt, Persia, Greece, and Rome, the Island of Cyprus was the resort of the *élite*, learned, and refined. It was at the time of the Crusades, when Richard I. of England assumed the title of King of Cyprus, that the famed eau de Chypre was introduced into Europe.

Extract of musk		1 pint
„ ambergris	of each	½ „
„ vanilla		
„ Tonquin bean		
„ orris		
Esprit de rose triple		2 pints

The mixture thus formed is one of the most lasting odours that can be made.

EMPRESS EUGÉNIE'S NOSEGAY.

Extract of musk „ vanilla „ Tonquin bean „ neroli	of each	¼ pint
„ geranium „ rose triple „ santal	of each	½ „

ESTERHAZY BOUQUET.

Extrait de fleur d'orange (from pomade)		1 pint
Esprit de rose triple		1 „
Extract of vitivert „ vanilla „ orris „ Tonquin	of each	1 „
Esprit de neroli		1 „
Extract of ambergris		½ „
Otto of santal		1 ounce
„ cloves		½ drachm

Notwithstanding the complex mixture here given, it is the vitivert that gives this bouquet its peculiar character. Few perfumes have excited a greater *furore* while in fashion.

ESS BOUQUET.

The reputation of this perfume has given rise to numerous imitations of the original article, more particularly on the Continent. In many of the shops in Germany and in France will be seen bottles labelled in close imitation of those sent out by Bayley and Co., Cockspur Street, London, who are, in truth, the original makers.

Esprit de rose triple	1 pint
Extract of ambergris	2 oz.
„ orris	8 „
Otto of lemons	¼ „
„ bergamot	1 „

The name 'ess' bouquet, which appears to puzzle some folk, is but a mere contraction of 'essence' of bouquet.

EAU DE COLOGNE.

First Quality.

Spirit (from grape) 60 over proof	6 gallons
Otto of neroli, *pétale*	3 oz.
„ „ *bigarade*	1 „
„ rosemary	2 „
„ orange zeste	5 „
„ citron zeste	5 „
„ bergamot	2 „

Mix with agitation; then allow it to stand for a few days perfectly quiet, before bottling.

Second Quality.

Spirit (from corn)	6 gallons
Otto of *Petit-grain*	2 oz.
„ neroli, *pétale*	½ „
„ rosemary	2 „
„ orange peel, „ lemon, „ bergamot	of each 4 „

Although eau de Cologne was originally introduced to the public as a sort of 'cure-all,' a regular 'elixir of life,' it now takes its place, not as a pharmaceutical product, but among perfumery. Of its remedial qualities we can say nothing, such matter being irrelevant to the purpose of this book. Considered, however, as a perfume, in the public taste it ranks very high; and although it is exceedingly volatile and evanescent, yet it has that excellent quality which is called 'refreshing.' Whether this be due to the rosemary or to the spirit, we cannot say, but think something may be attributed to both. One important thing relating to

eau de Cologne must not, however, pass unnoticed; and that is, the quality of the spirit used in its manufacture. The utter impossibility of making brandy with English spirit in any way to resemble the real Cognac, is well known. It is equally impossible to make eau de Cologne with English spirit, to resemble the original article. To speak of the 'purity' of French spirit, or of the 'impurity' of English spirit, is equally absurd. The fact is, that spirit derived from grapes and spirit obtained from corn have each so distinct and characteristic an aroma, that the one cannot be mistaken for the other. The odour of grape spirit is said to be due to the œnanthic ether which it contains. The English spirit, on the other hand, owes its odour to fusel oil. So powerful is the œnanthic ether in the French spirit, that, notwithstanding the addition to it of such intensely odoriferous substances as the ottos of neroli, rosemary, and others, it still gives a characteristic perfume to the products made containing it, and hence the difficulty of preparing eau de Cologne with any spirit destitute of this substance.

Although very fine eau de Cologne is often made by merely mixing the ingredients as indicated in the recipe as above, yet it is better, first, to mix all the citrine ottos with spirit, and then to distil the mixture, afterwards adding to the distillate the rosemary and nerolis, such process being the one adopted by the most popular house at Cologne.

A great many forms for the manufacture of eau de Cologne have been published, the authors of some of the recipes evidently having no knowledge, in a practical sense, of what they were putting, by theory, on paper. Other venturers, to show their lore, have searched out all the aromatics of Lindley's 'Botany,' and would persuade us to use absinthe, hyssop, anise, juniper, marjoram, caraway, fennel, cumin, cardamom, cinnamon, nutmeg, serpolet,

angelica, cloves, lavender, camphor, balm, peppermint, galanga, lemon thyme, &c. &c. &c.

All these, however, are but hum——! Where it is a mere matter of profit, and the formula that we have given is too expensive to produce the article required, it is better to dilute the said Cologne with a weak spirit, or with rose-water, and then filter it through paper with a little magnesia, rather than otherwise alter its form; because, although weak, the true aroma of the original article is retained.

The recipe of the second quality of eau de Cologne is given, to show that a very good article can be produced with English spirit.

FLOWERS OF ERIN.

Extract of white rose (see WHITE ROSE) . .	1 pint
„ vanilla	1 oz.

NEW MOWN HAY.

Good hay—sweet hay hath no fellow,

says Shakspeare. True, the fragrance of hay is one of the most grateful to our senses, and it is natural that there should be a demand for a perfume of this odour.

The odour of hay is due to the vernal grass it contains. When vernal grass is well grown, cut, and dried, it evolves an odorous principle similar to that yielded by the Coumarin or Tonquin bean; hence the employment of the latter in the following mixture, which gives general satisfaction:—

Extract of Tonquin bean	2 pints
„ geranium	1 pint
„ orange flowers	1 „
„ rose flowers	1 „
„ „ triple	1 „
„ jessamine	1 „

ROYAL HUNT BOUQUET.

Esprit de rose, triple		1 pint
„ neroli	of each	¼ „
„ acacia		
„ fleur d'orange		
„ musk		
„ orris		
„ Tonquin		½ „
Otto of citron zeste		2 drachms

BOUQUET DE FLORA; otherwise, EXTRACT OF FLOWERS.

Esprit de rose	from pomade, of each	1 pint
„ tubereuse		
„ violette		
Extract of benzoin		1½ oz.
Otto of bergamot		2 „
„ citron zeste	of each	½ „
„ orange zeste		

THE GUARDS' BOUQUET.

Esprit de rose		2 pints
„ neroli	of each	½ „
Extract of vanilla		
„ orris		
„ musk		¼ „
Otto of cloves		½ drachm

FLEUR D'ITALIE; or, ITALIAN NOSEGAY.

Esprit de rose, from pomade		2 pints
„ „ triple		1 „
„ jasmine	from pomade, of each	1 „
„ violette		
Extract of cassie		½ „
„ musk	of each	2 oz.
„ ambergris		

JOCKEY CLUB BOUQUET.

English Formula.

Extract of orris root		2 pints
Esprit de rose, triple		1 „
„ de pommade		1 „
Extrait de cassie	de pommade, of each	½ „
„ tubereuse		
„ ambergris		½ „
Otto of bergamot		½ oz.

French Formula.

Esprit de rose, de pommade	1 pint
„ tubereuse	1 „
„ cassie	½ „
„ jasmin	¾ „
Extract of civet	3 oz.

Independently of the materials employed being different to the original English recipe, it must be remembered that all the French perfumes are made with brandy, *i.e.* grape spirit; whereas the English perfumes are made with corn spirit, which alone modifies their odour. Though good for some mixtures, yet for others the grape spirit is very objectionable, on account of the predominance of its own aroma.

We have spoken of the difference in the odour between the English and French spirit; the marked distinction of British and Parisian perfumes made according to the same recipes is entirely due to the different spirits employed. Owing to the strong 'bouquet' of the French spirit in comparison with ours, the Continental perfumers claim a superiority in the quality of their perfumes, but this aroma in truth is objectionable in many instances. Now, although we candidly admit that *some* odours are better when prepared with grape spirit than with that from corn, yet there are others which are undoubtedly the best when prepared with spirit derived from the latter source. Musk, ambergris, civet,

violet, tubereuse, and jasmine, if we require to retain their true aroma when in solution in alcohol, must be made with the British spirit.

All the citrine odours, verveine, vulnary waters, eau de Cologne, eau de Portugal, eau d'Arquebuzade, and lavender, can alone be brought to perfection by using the French spirit in their manufacture. If extract of jasmine, or extract of violet, &c., be made with the French or brandy spirit, the true characteristic odour of the flower is lost to the olfactory nerve—so completely does the œnanthic ether of the grape spirit hide the flowery aroma of the otto of violet in solution with it. This solves the paradox that English extract of violet and its compounds, 'Excelsior,' &c., is at all times in demand on the Continent, although the very flowers with which we make it are grown there.

On the contrary, if an English perfumer attempts to make eau de Portugal, &c., to bear any comparison, as a fine odour, to that made by Lubin of Bond Street, London, without using grape spirit, his attempt will prove a failure. True, he makes eau de Portugal even with English corn spirit; but judges of the article—and they alone can stamp its merit—discover instantly the same difference as the connoisseur finds out between 'Patent British' and foreign brandy.

Perhaps it may not be out of place here to observe that what is sold in this country as British brandy is in truth grape spirit; that is, foreign brandy, very largely mixed with English spirit! By this scheme, a real semblance to the foreign brandy flavour is maintained; the difference in duty upon English and foreign spirit enables the makers of the 'capsuled' article to undersell those who vend the unsophisticated Cognac.

Some chemists, not being very deep in the 'tricks of trade,' have thought that some flavouring, or that œnanthic ether, was used to impart to British spirit the Cognac aroma.

An article is even in the market called 'Essence of Cognac,' but which is nothing more than very badly made butyric ether.

On the Continent a great deal of spirit is procured by the fermentation of the molasses from beet-root; this, of course, finds its way into the market, and is often mixed with the grape spirit; so, also, in England we have spirit from potatoes which is mixed with the corn spirit. These adulterations, if we may so term them, modify the relative odours of the primitive alcohols.

A JAPANESE PERFUME.

Extract of rose, triple	}	
„ vitivert		
„ patchouly	} of each	½ pint
„ cedar		
„ santal	}	
„ verveine		¼ „

KEW GARDEN NOSEGAY.

Esprit de neroli (*pétale*)		1 pint
„ cassie	}	
„ tubereuse	} from pomade, of each	½ „
„ jasmin	}	
„ geranium		½ „
„ musk	}	
„ ambergris	} of each	3 oz.

STOLEN KISSES.

'The kisses of a thousand flowers,
Stolen from them while they sleep.'—R. BROUGH.

Extract of jonquil	}	
„ orris	} of each	1 quart
„ Tonquin	}	
„ rose triple	} of each	1 pint
„ acacia	}	
„ civet	}	
„ ambergris	} of each	¼ „
Otto of citronella		1 drachm
„ verbena		½ „

EAU DES MILLEFLEURS.

Esprit de rose triple		1 pint
„ rose de pommade	from pomade, of each	½ „
„ tubereuse		
„ jasmin		
„ fleur d'orange		
„ cassie		
„ violette		
Extract of cedar		¼ „
„ vanilla	of each	2 oz.
„ ambergris		
„ musk		
Otto of almonds	of each	10 drops
„ neroli		
„ cloves		
„ bergamot		1 oz.

These ingredients are to remain together for at least a fortnight, then filtered prior to sale.

MILLEFLEURS ET LAVENDER.

Essence of lavender (*Mitcham*)	½ pint
Eau des millefleurs	1 „

DELCROIX'S MILLEFLEUR LAVENDER.

Spirits from grape	1 pint
French otto of lavender	1 oz.
Extract of ambergris	2 „

The original 'lavender aux millefleurs' is that of Delcroix; its peculiar odour is due to the French otto of lavender, which, although some folks like it, is very inferior to the English otto of lavender; hence the formula first given is far superior to that by the inventor, and has almost superseded the original preparations.

There are several other compounds or bouquets, of which lavender is the leading ingredient, and from which they take

their name, such as lavender and ambergris, lavender and musk, lavender and maréchale, &c., all of which are composed of fine spirituous essences of lavender, with about 15 per cent. of any of the other ingredients.

BOUQUET DU MARÉCHAL.

Esprit de rose triple Extrait de fleur d'orange.	of each	1 pint
„ vitivert „ vanilla „ orris „ Tonquin	of each	½ „
Esprit de neroli Extract of musk „ ambergris	of each	¼ „
Otto of cloves „ santal	of each	½ drachm

EAU DE MOUSSELINE.

Bouquet de maréchale		1 pint
Extrait de cassie „ jasmin „ tubereuse „ rose	from pomade, of each.	½ „
Otto of santal		2 drachms

BOUQUET DE MONTPELLIER.

Extrait de tubereuse		1 pint
„ rose de pommade		1 „
„ „ triple		1 „
Extract of musk „ ambergris	of each	¼ „
Otto of cloves		1½ drachm
„ bergamot		½ oz.

A century ago Montpellier was the principal seat of the manufacture of perfumery, and the name of the above scent is handed down from a recipe of still earlier date. We find

Evelyn reminding his kinsman, when about to make the *grand tour*, that—

Montpellier was wont to be the place of rare opportunities for the learning the many excellent receipts to make perfumes, sweet powders, pomades, antidotes, and divers such curiosities, which I know (he adds) you will not omit; for though they are indeed but trifles in comparison with more solid things, yet if ever you should affect to live a retired life hereafter, you will take more pleasure in these recreations than you can now imagine.

Doubtless the philosophical master of Sayes Court had himself made trial of the recreation.

CAPRICE DE LA MODE.

Extrait de jasmin „ tubereuse „ cassie „ fleur d'orange	of each	½ pint
Otto of almonds		10 drops
„ nutmegs		10 „
Extract of civet		¼ pint

MAY FLOWERS.

Extract of rose (de pommade) „ jasmine „ fleur d'orange „ cassie	of each	½ pint
„ vanilla		1 „
Otto of almonds		¼ drachm

LEAP-YEAR BOUQUET.

'In leap-year *they* have power to choose;
Ye men no charter to refuse.'—OLD SONG.

Extrait de tubereuse „ jasmin	of each	1 pint
„ rose triple „ santal „ vitivert „ patchouly	of each	½ „
„ verbena		⅛ „

INTERNATIONAL BOUQUET OF ALL NATIONS.

Nations wherein the Odours are produced.		
TURKEY	Esprit de rose triple	½ pint
AFRICA	Extract of jasmine	½ „
ENGLAND	„ lavender	¼ „
FRANCE	„ tubereuse	½ „
SOUTH AMERICA	„ vanilla	¼ „
TIMOR	„ santal	¼ „
ITALY	„ violet	1 „
HINDOOSTAN	„ patchouly	¼ „
CEYLON	Otto of citronella	1 drachm
SARDINIA	„ lemons	½ oz.
TONQUIN	Extract of musk	½ pint

ISLE OF WIGHT BOUQUET.

Extract of orris	½ pint
„ vitivert	¼ „
„ santal	1 „
„ rose	½ „

BOUQUET DU ROI.

Extract of jasmine, „ violet, „ rose	from pomade, of each	1 pint
„ vanilla, „ vitivert	of each	¼ „
„ musk, „ ambergris	of each	1 oz.
Otto of bergamot		1 drachm
„ cloves		1 oz.

BOUQUET DE LA REINE D'ANGLETERRE.

Esprit de rose, Extrait de violette	from pomade, of each	1 pint
„ tubereuse		½ „
„ fleur d'orange		¼ „
Otto of bergamot		¼ oz.

RONDELETIA.

The perfume bearing the above name is undoubtedly one of the most gratifying to the smelling nerve that has ever been made. Its inventors, Messrs. Hannay and Dietrichsen, have probably taken the *name* of this odour from the *Rondeletia*, the *Chyn-len* of the Chinese; or from the *R. odorata* of the West Indies, which has a sweet odour. The plant itself was so named after Rondeletius, a botanical writer of the sixteenth century. We have before observed that there is a similarity of effect upon the olfactory nerve produced by certain odours, although derived from totally different sources: that, for instance, otto of almonds may be mixed with extract of violet in such proportion that, although the odour is increased, yet the character peculiar to the violet is not destroyed. Again: there are certain odours which, on being mixed in due proportion, produce a new aroma, perfectly distinct and peculiar to itself. This effect is exemplified by comparison with the influence of certain colours, when mixed, upon the nerve of vision: such, for instance, as when yellow and blue are mixed, the result we call green; or when blue and red are united, the compound colour is known as puce or violet.

Now when the odour of lavender and odour of cloves are mixed, they produce a new fragrance, *i.e.* Rondeletia! It is such combinations that constitute in reality 'a new perfume,' which, though often advertised, is very rarely attained. Jasmine and patchouly produce a novel aroma, and many others in like manner; proportion and relative strength, when so mixed, must of course be studied, and the substances used accordingly. If the same quantity of any given otto be dissolved in a like proportion of spirit, and the solution be mixed in equal proportions, the strongest odour is instantly indicated by covering or hiding the presence of the other. In this way we discover that patchouly, vitivert, lavender, and verbena are

the most potent of the vegetable odours, and that violet, tubereuse, and jasmine are the most delicate.

Many persons will at first consider that we are asking too much, when we express a desire to have the same deference paid to the olfactory nerve as to the other nerves that influence our physical pleasures and pains. By tutoring the olfactory nerve, it is capable of perceiving matter of the most subtle nature in the atmosphere: not only that which is pleasant, but also such as are unhealthful. If an unpleasant odour is a warning to seek a purer atmosphere, surely it is worth while to cultivate that power which enables us to act up to that warning for the general benefit to health.

If we do not do so, some future Macaulay will say of us as David said of the idols, 'Noses have they, but they smell not.' Shakspeare tells us

> A good nose is requisite.—*Winter's Tale*, iv. 3.

Again, he observes,

> Their very noses had been counsellors.—*Henry VIII.* i.

To return, however, to Rondeletia, it will be seen by the annexed formula, that, besides the main ingredients to which it owes its peculiar character—that is, cloves and lavender—it contains musk, vanilla, &c. These substances are used, in these as in nearly all other bouquets, for the sole purpose of fixing the more volatile odours to the handkerchief.

Essence of Rondeletia.

Spirit (60 over proof)		1 gallon
Otto of lavender		2 oz.
„ cloves		1 „
„ roses		3 drachms
„ bergamot		1 oz.
Extract of musk		
„ vanilla	of each	½ pint
„ ambergris		

The mixture must be made at least a month before it is fit for sale. Very excellent Rondeletia may also be made by adding ¾ drachm otto of cloves to a pint of lavender mille-fleur.

PIESSE'S POSY.

Extract of rose (from pomade)	1 pint
Esprit de rose triple	½ „
Extract of jasmine, violet, verbena, cassie — from pomade, of each	½ „
Otto of lemons, bergamot — of each	2½ oz.
Extract of musk, ambergris — of each	¼ „
	1 „

SUAVE.

Extract of tubereuse, jasmine, cassie, rose — from pomade, of each	1 pint
„ vanilla	5 oz.
„ musk, ambergris — of each	2 „
Otto of bergamot	¼ „
„ cloves	1 drachm

SPRING FLOWERS.

Extract of rose, violet — from pomade, of each	1 pint
„ rose triple	2½ oz.
„ cassie	2½ „
Otto of bergamot	2 drachms
Extract of ambergris	1 oz.

The just reputation of this perfume places it in the first rank of the very best mixtures that have ever been made by any manufacturing perfumer. Its odour is truly flowery, but

peculiar to itself. Being unlike any other aroma, it cannot well be imitated, chiefly because there is nothing that we are acquainted with that at all resembles the odour of the esprit de rose, as derived from macerating rose pomade in spirit, to which, and to the extract of violet, nicely counterpoised, so that neither odour predominates, the peculiar character of 'Spring Flowers' is due; the little ambergris that is present gives permanence to the odour upon the handkerchief, although, from the very nature of the ingredients, it may be said to be a fleeting odour. 'Spring Flowers' is an Englishman's invention, but there is scarcely a perfumer in Europe that does not attempt an imitation.

BOUQUET OPOPONAX.

Pod musk	1 oz.
Vanilla beans	8 „
Tonquin beans	4 „

Infuse these for one month in

Spirit, 60 over proof,	10 pints

then add

Tincture of orris	1 pints
Millefleur essence from mixed pomatums	8 „
Citron zeste	2 oz.
Bergamot	2 „
Otto of rose	1½ oz.
Otto of opoponax	½ oz.

The addition of the latter gives a peculiar character to the whole.

TULIP NOSEGAY.

Nearly all the tulip tribe, although beautiful to the eye, are inodorous. The variety called the Duc van Thol, however, yields an exquisite perfume, but is not used by the manufacturer for the purpose of extracting its odour. He,

however, borrows its poetical name, and makes an excellent imitation thus :—

Extract of tubereuse „ violet „ jasmin	from pomade, of each	1 pint
„ rose		½ „
„ orris		3 oz.
Otto of almonds		2 drops

VIOLETTE DES BOIS.

Under the head Violet, we have already explained the method of preparing the extract or essence of that modest flower. The Parisian perfumers sell a mixture of violet, which is very beautiful, under the title of the Violette des Bois, or the Wood Violet, which is made thus :—

Extract of violet	1 pint
„ orris	3 oz.
„ cassie	3 „
„ rose (from pomade)	3 „
Otto of almonds	3 drops

This mixture, in a general way, gives more satisfaction to the customer than the pure violet.

RIFLE VOLUNTEERS' GARLAND.

Alcohol		1 pint
Otto of neroli „ rose „ lavender „ bergamot	of each	¼ oz.
„ cloves		8 drops
Extract of orris		1 pint
„ jasmine „ cassie	of each	¼ „
„ musk „ ambergris	of each	2½ oz.

YACHT CLUB BOUQUET.

Extract of santal			1 pint
„ neroli			1 „
„ jasmine	of each		½ „
„ rose triple			
„ vanilla			¼ „
Flowers of benzoin			¼ oz.

WEST END BOUQUET.

Extract of cassie			
„ violet	of each		1 pint
„ tubereuse			
„ jasmine			
Esprit de rose triple			3 „
Extract of musk	of each		½ „
„ ambergris			
Otto of bergamot			1 oz.

We have now completed the branch of the art of perfumery which relates to handkerchief perfumes, or wet perfumery. Although we have rather too much encroached upon the space of this work, in giving the composition of so many bouquets, yet there are many left unnoticed which are popular. Those that are given are noted more particularly for the peculiar character of their odour, and are selected from more than a thousand recipes that have been practically tried.

Those readers who require to know anything about the simple extracts of flowers are referred to them under their respective alphabetical titles.

FOUNTAIN RING.

As a means of carrying scent about the person, the FOUNTAIN FINGER-RING has recently become famous.

The delight of all who have seen this little conceit is most gratifying to its inventor. It is at once useful and ornamental. By the least pressure, the wearer of the ring can cause a jet of perfume to arise from it at any time desired—thus every one can carry with him to a ball, concert, or sick chamber, enough scent, so refreshing! for the time being.

The practical application of this invention causes a good deal of merriment and laughter. A gentleman who abhors



FOUNTAIN FINGER-RING.

perfume, unless it be snuff, 'squeezing' a lady's hand, will receive a shower of the eternal frangipanni or kiss-me-quick, much to the delight of all present at being thus sweetly 'found out.'

The rings can be filled with perfume with the greatest ease—thus: Press the ball at the back of the ring nearly flat, pour scent into a cup and dip the ring into it; the elasticity of the ball will then draw the perfume into the interior till full.

SECTION IX.

Earth smiles in all her rich attire,
Here fragrant plants their odours shed.
HAYDN'S *Creation.*

THE previous articles have exclusively treated of Wet Perfumes; the present matter relates to Dry Perfumes—sachet powders, tablets, pastilles, fumigation by the aid of heat, of volatile odorous resins, &c., &c. The perfumes used by the ancients were, undoubtedly, nothing more than the odoriferous gums which naturally exude from various trees and shrubs indigenous to the Eastern hemisphere: that they were very extensively used and much valued, we have only to read the Scriptures for proofs:—'Who is this that cometh . . . perfumed with myrrh and frankincense, with all the powders of the merchant?' (Song of Solomon, iii. 6.) Abstaining from the use of perfume in Eastern countries is considered as a sign of humiliation.—'And it shall come to pass that instead of sweet smell there shall be stink.' (Isaiah, iii. 20, 24.) 'And they came and brought tablets.' (Exod. xxxv. 22.) The word tablets in this passage means perfume boxes, curiously inlaid, made of metal wood and ivory. Some of these boxes may have been made in the shape of buildings, which would explain the word *palaces* in Psalm xlv. 8:—'All thy garments smell of myrrh, and aloes, and cassia, out of the ivory palaces, whereby they have made thee glad.' From what is said in Matt. ii. 11, it would appear that perfumes were considered among the most valuable

gifts that man could bestow:—'And when they [the wise men] had opened their treasures, they presented unto him [Christ] gifts; gold, and frankincense, and myrrh.' As far as we are able to learn, all the perfumes used by the Egyptians and Persians during the early period of the world were *dry* perfumes, consisting of spikenard (*Nardostachys Jatamansi*), myrrh, olibanum, and other gum resins, nearly all of which are still in use by the manufacturers of odours. Among the curiosities shown at Alnwick Castle is a vase that was taken from an Egyptian catacomb. It is full of a mixture of gum resins, &c., which evolve a pleasant odour to the present day, although probably 3,000 years old. We have no doubt that the original use of this vase and its contents was for perfuming apartments, in the same way that pot-pourri is now used.

A very interesting relic of the use of dry perfumes, about the period of the fifteenth century, is

THE POMANDER.



The above illustration is drawn from an antique silver pomander in the South Kensington Museum. The ring serves the purpose, as it was commonly worn as a pendant to a lady's girdle. When the cap under the ring is unscrewed, the

pomander falls into six cores, each core being attached at its base with a hinge to the central column; a slide opens at the angle of the core for the insertion of fragrant powders, camphor, vinegar on sponge, &c. Some of the cores being perforated has given rise to the common vinaigrette. Chambers in his 'Book of Days' says:—

The orange appears to have been used as a pomander soon after its introduction into England. Cavendish describes Cardinal Wolsey entering a crowded chamber 'holding in his hand a very fair orange, whereof the meat or substance within was taken out, and filled up again with the part of a sponge, wherein was vinegar and other confections against the pestilent airs; the which he most commonly smelt unto, passing among the press, or else he was pestered with many suiters.'

Sir Thomas Gresham, in his celebrated portrait by Sir Antonio More, holds in his left hand a small object resembling an orange, but which is a *pomander*. This sometimes consists of a dried Seville orange, stuffed with cloves and other spices; and being esteemed a fashionable preservative against infection, it frequently occurs in old portraits, either suspended to the girdle or held in the hand. In the eighteenth century, the signification of this object has become so far forgotten, that, instead of pomanders, *bonâ fide* oranges were introduced into portraits, a practice which Goldsmith has happily satirised in his 'Vicar of Wakefield,' where seven of the Flamboroughs are drawn with seven oranges, &c.

The pouncet-box mentioned by Shakspeare I imagine to be nothing more than a variety of dry scent-box.

Hotspur. And twixt his finger and his thumb he held
A pouncet-box, which ever and anon he gave
His nose and took 't away again.
He made me mad
To see him shine so briskly and smell so sweet.
King Henry IV., act i. scene 3.

SACHET POWDERS.

The French and English perfumers concoct a great variety of these substances, which, being put into silk bags

or ornamental envelopes, find a ready sale, being both good to smell and economical as a means of imparting an agreeable odour to linen and clothes as they lie in drawers. The following formula shows their composition. Every material is either to be ground in a mill, or powdered in a mortar, and afterwards sifted.

Acacia Sachet.

Cassie flower heads	1 lb.
Orris powder	1 „

This is a very nice sachet, and smells something like tea.

The materials employed in the manufacture of sachet powders are those only which retain an odour or are fragrant in their dried state, which include nearly all that are termed herbs in domestic economy, such as lemon, thyme, mint, &c., and some few leaves of plants, such as those of the orange tree, citron tree, &c. Very few blossoms, however, except lavender, rose, and cassie, have any fragrance when dried. The jasmine, tubereuse, violet, and mignonette, retain none of their primitive smell when thus treated, indicating clearly that the odours of these plants are generated only during their life and are not stored up in their petals, as is the case with the others named.

The engraving on the following page shows the warm air cupboards, where herbs are dried for this purpose.

From the rafters of the roof of the drying-house are suspended, in bunches, all the herbs that the grower cultivates. To accelerate the desiccation of rose leaves, and other petals, the drying-house is fitted up with large cupboards, which are slightly warmed with a convolving flue from a fire below.

The flower buds are placed upon trays made of canvas, stretched upon a frame, each being not less than twelve feet long by four feet wide. When charged, they are placed on shelves in the warm cupboards till dry.

Sachet au Chypre.

Ground rose-wood	1 lb.
„ cedar-wood	1 „
„ santal-wood	1 „
Otto of rose-wood	3 drachms

Mix and sift; it is then fit for sale.



DRYING HOUSE.

Frangipanni Sachet.

Orris-root powder	3 lbs.
Vitivert powder	½ lb.
Santal-wood powder	¼ „
Otto of neroli, „ rose, „ santal (of each)	1 drachm
Musk pods, ground	1 oz.
„ civet	¼ „

The name of this sachet has been handed down to us as being derived from a Roman of the noble family of Frangipanni. Mutio Frangipanni was an alchemist, evidently of some repute, as we have another article called rosolis, or rossolis, *sun-dew*, an aromatic spirituous liquor, used as a stomachic, of which he is said to have been the inventor, composed of wine in which is steeped coriander, fennel, anise, and musk.

Heliotrope Sachet.

Powdered orris	2 lbs.
Rose leaves, ground	1 lb.
Tonquin beans, ground	½ „
Vanilla beans	¼ „
Grain musk	¼ oz.
Otto of almonds	5 drops

When well mixed by sifting in a coarse sieve, it is fit for sale.

It is one of the best sachets made, and is so perfectly *au naturel* in its odour to the flower from which it derives its name, that no person unacquainted with its composition would, for an instant, believe it to be any other than the 'real thing.'

Lavender Sachet.

Lavender flowers, ground	1 lb.
Gum benzoin, in powder	¼ „
Otto of lavender	¼ oz.

A hundred years ago Shenstone, the Shropshire poet, wrote of dried lavender:—

> And lavender, whose spikes of azure bloom
> Shall be erewhile in arid bundles bound,
> To lurk amidst her labours of the loom,
> And crown her kerchiefs clean with mickle rare perfume.

And more than two hundred years ago, Izaak Walton, in commendation of the 'honest ale-house' where he proposed to entertain his friend, said:—'We shall find a cleanly room,

lavender in the window, and twenty ballads stuck about the wall.' And again:—'Let's go to that house, for the linen looks white, and *smells of lavender*, and I long to be in a pair of sheets that smell so.'

Maréchale Sachet.

Powder of santal-wood	½ lb.
„ orris root	½ „
Rose leaves, ground	¼ „
Cloves, ground	¼ „
Cassia bark	¼ „
Grain musk	½ drachm

Mousseline Sachet.

Vitivert, in powder	1 lb.
Santal-wood, Orris — of each	½ „
Black-currant leaves (*casse*)	½ „
Benzoin, in powder	¼ „
Otto of thyme	5 drops
„ roses	½ drachm

Millefleur Sachet.

Lavender flowers, ground, Orris, Rose leaves, Benzoin — of each	1 lb.
Tonquin, Vanilla, Santal — of each	¼ „
Musk and civet each	2 drachms
Cloves, ground	¼ lb.
Cinnamon, Allspice — of each	2 oz.

Portugal Sachet.

Dried orange peel	1 lb.
„ lemon peel	½ „
„ orris root	½ „
Otto of orange peel	1 oz.
„ neroli	¼ drachm
„ lemon grass	¼ „

Patchouly Sachet.

Patchouly herb, ground	1 lb.
Otto of patchouly	¼ drachm

Patchouly herb is often sold in its natural state, as imported, tied up in bundles of half a pound each.

Pot-Pourri.

This is a mixture of dried flowers and spices *not* ground.

Dried lavender	1 lb.
Whole rose leaves	1 „
Crushed orris (coarse)	½ „
Broken cloves, „ cinnamon, „ allspice (of each)	2 oz.
Table salt	1 lb.

We need scarcely observe that the salt is only used to increase the bulk and weight of the product, in order to sell it cheap.

Olla-Podrida.

This is a similar preparation to pot-pourri. No regular form can be given for it, as it is generally made, or 'knocked up,' with the refuse and spent materials derived from other processes in the manufacture of perfumery; such as the spent vanilla after the manufacture of tincture or extract of vanilla, or of the grain musk from the extract of musk, orris from the tincture, Tonquin beans after tincturation, &c., &c., mixed up with rose-leaves, lavender, or any odoriferous herbs.

Rose Sachet.

Rose heels or leaves	1 lb.
Santal-wood, ground	½ „
Otto of roses	¼ oz.

Santal-Wood Sachet.

This is a good and economical sachet, and simply consists of the ground wood. Santal-wood is to be purchased from some of the wholesale drysalters; the drug-grinders are the people to reduce it to powder; any attempt to do so at home will be found unavailing, on account of its toughness.

Sachet (without a name).

Dried thyme, „ lemon-thyme, „ mint, „ marjoram	of each ¼ lb.
„ lavender	½ „
„ rose heels	1 „
Ground cloves	2 oz.
Calamus powder	1 lb.
Musk, in grain	1 drachm

Vervein Sachet.

Lemon-peel, dried and ground	1 lb.
Lemon-thyme	¼ „
Otto of lemon-grass	1 drachm
„ „ peel	½ oz.
„ bergamot	1 „

Vitivert Sachet.

The fibrous roots of the *Anatherum muricatum*, being ground, constitute the sachet bearing the name as above, derived from the Tamool name, *vittie vayer*, and called by the Parisian *vetiver*. Its odour resembles myrrh. Vitivert is more often sold tied up in bunches, as imported from India, than ground, and is used for the prevention of moth rather than as a perfume.

Violet Sachet.

Black-currant leaves	1 lb.
Cassie flower heads	1 „

Rose heels or leaves	1 lb.
Orris root powder	2 lbs.
Otto of almonds	¼ drachm
Grain musk	1 „
Gum benzoin, in powder	½ lb.

Well mix the ingredients by sifting; keep them together for a week in a glass or porcelain jar before offering for sale.

There are many other sachets manufactured besides those already given; but, for actual trade purposes, there is no advantage in keeping a greater variety than those named. There are, however, many other substances used in a similar way; the most popular is the

PEAU D'ESPAGNE.

Peau d'Espagne, or Spanish skin, is highly perfumed leather, prepared thus:—Good sound pieces of wash-leather are to be steeped in a mixture of ottos, in which are dissolved some odoriferous gum resins:—otto of neroli, otto of rose, santal, of each half an ounce; otto of lavender, verbena, bergamot, of each a quarter of an ounce; otto of cloves and cinnamon, of each two drachms; with any others thought fit. In half a pint of spirit, dissolve about four ounces of gum benzoin, and add it to the mixed ottos: now place the skin to steep in the mixture for a day or so, then remove it, and squeeze out the superfluous scent; finally, let the skin dry by exposure to the air. A paste is now to be made by rubbing in a mortar one drachm of civet with one drachm of grain-musk, and enough solution of gum acacia or gum tragacantha to give it a spreading consistence; a little of any of the ottos that may be left from the steep, stirred in with the civet, &c., greatly assists in making the whole of an equal body; the skin, being cut up into pieces of about four inches square, is then to be spread over, plaster fashion, with the last-named

compost: two pieces being put together, having the civet plaster inside them, are then to be placed between sheets of paper, weighted or pressed, and left to dry thus for a week; finally, each double skin, now called peau d'Espagne, is to be enveloped in some pretty silk or satin, and finished off to the taste of the vendor.

Card or leather thus prepared evolve a pleasant odour for years, and hence are frequently called 'the inexhaustible sachet.' Being flat, they are much used for perfuming writing-paper.

The lasting odour of Russia leather is familiar to all and pleasing to many; its perfume is due to the aromatic sanders wood, with which it is tanned, and to the empyreumatic oil of the bark of the birch-tree, with which it is curried. The odour of Russia leather is, however, not *recherché* enough to be considered as a perfume; but, nevertheless, leather can be impregnated, by steeping in the various ottos, with any sweet scent, and which it retains to a remarkable degree, especially with otto of santal or lemon grass (*Verbena*). In this manner the odour of the peau d'Espagne can be greatly varied, and gives much satisfaction, on account of the permanence of its perfume. Another way of making a good flat sachet, is to make a mixture of civet and musk, thinned down by rubbing in a mortar with liquid gum, spreading this compound on card-board; when dry, the card may be plaited over with coloured ribbons.

PERFUMED LETTER-PAPER.

If a piece of peau d'Espagne be placed in contact with paper, the latter absorbs sufficient odour to be considered as 'perfumed.' It is obvious that paper for writing upon must not be touched with any of the odorous tinctures or ottos, on account of any such matters interfering with the fluidity of

the ink and action of the pen in writing upon it; therefore, by the process of infection, as it were, alone can writing-paper be perfumed to advantage.

Besides the sachets mentioned, there are many other substances applied as dry perfumery, such as scented wadding, used for quilting into all sorts of articles adapted for use in a lady's boudoir. Pin-cushions, jewel-cases, and the like, are lined with it. Cotton, so perfumed, is simply steeped in some strong essence, of musk, &c.

PERFUMED BOOK-MARKS.

We have seen that leather can be impregnated with odoriferous substances, in the manufacture of peau d'Espagne; just so is card-board treated prior to being made up into book-marks. In finishing them for sale, taste alone dictates their design; some are ornamented with beads, others with embroidery.

SCENTING GEMS.

Curiosity is excited to know how these gems are capable of yielding fragrance like a natural flower, and from what country they come.

As they are moved about in the *petite boîte* which contains them, we see the beauty of the kaleidoscope, and smell the most delightful odour. The truth is, that under the silver paper upon which the gems rest there is card punched to the size of the box; on each card is brushed a mixture of musk, civet, and otto of rose, rubbed together with a little mucilage of tragacanth.

CASSOLETTES AND PRINTANIERS.

Cassolettes and printaniers are little ivory boxes, of various designs, perforated in order to allow the escape of the

odours contained therein. The paste used for filling these 'ivory palaces whereby we are made glad,'[1] is composed of equal parts of grain musk, ambergris, seeds of the vanilla pod, otto of roses, and orris powder, with enough gum acacia, or gum tragacantha, to work the whole together into a paste. These things are now principally used for perfuming the pocket or reticule, much in the same way that ornamental silver and gold vinaigrettes are used.

SCENTED SHELLS.

Venetian Shells, which are found in such abundance on the shores of the Adriatic Sea, the Greek and Maldive Islands, are cleansed with weak muriatic acid; they then assume their pearly lustre. A mixture of ottos is made, say half a pound of bergamot, a quarter of a pound of santal-wood, and two ounces each lavender and rosewood; in this mixture is rubbed one drachm of civet, and two drachms of musk.

The shells are then steeped into the scent, which ascends into their convolving tube. When dry, these shells will serve for perfuming jewel-cases and work-boxes.

INCENSE.

There is no doubt whatever that the origin of the use of pastils, or pastilles, as they are more often called, from the French, has been derived from the use of incense at the altars of the temples during the religious services:—'According to the custom of the priest's office, his lot [Zacharias'] was to burn incense when he went into the temple of the Lord' (Luke i. 9). 'And thou shalt make an altar to burn incense upon. . . . And Aaron shall burn thereon sweet incense

[1] Psalm xlv. 8.

every morning, when he dresseth the lamps, and at even when he lighteth the lamps, he shall burn incense upon it' (Exod. xxx. 1, 7).

The Censer.

'On the walls of every temple in Egypt, from Meröe to Memphis, the censer is depicted smoking before the pre-



HIGH PRIEST AND ALTAR.

siding deity of the place; on the walls of the tombs glow in bright colours the preparation of spices and perfumes.' In the British Museum there is a vase (No. 2,595) the body of which is intended to contain a lamp, the sides being perforated to admit the heat from the flame to act upon the projecting tubes, which are intended to contain ottos of flowers placed in the small vases at the end of the tubes; the heat

volatilises the ottos, and quickly perfumes an apartment. This vase or censer is from an Egyptian catacomb.

The censer, as used in the 'holy places,' is made either of brass, silver, or gold, and often set with precious stones; its form is represented in the engraving below, the upper part being perforated to allow the escape of the perfume.[1] In the outer vessel is placed an inner one of copper, which can be taken out and filled with ignited charcoal. When in use, the



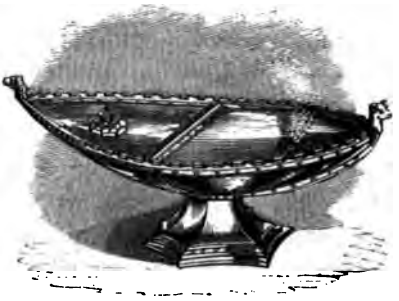
THE CENSER.

ignited carbon is placed in the censer, and is then covered with the incense; the heat rapidly volatilises it in visible fumes. The effect is assisted by the incense-bearer swinging the censer, attached to three long chains, in the air. The manner of swinging the censers varies slightly in the churches in Rome, in France, and in England, some holding it above the head.

[1] The word "Perfume" is derived from the Latin *per-fumus*, by smoke, because the first perfumes used were of the smoke kind.

At LA MADELEINE, the method is always to give the censer a full swing at the greatest length of the chains with the right hand, and to catch it up short with the left hand.

The engraving below represents an ancient incense case and burner, the original of which is in silver, eleven inches long. It is in the possession of William Wells, Esq., of Holme Wood House, Whittlesea, Cambridgeshire. It was found during the draining of Whittlesea Mere. Its form and construction are well suited for the object in view; when not in use, it is an elegant article of *vertu* for the boudoir, and, when required, contains within the boat the incense and matches for



SILVER INCENSE CASE, FOUND IN WHITTLESEA MERE, CAMBRIDGESHIRE.

igniting it. It is probable that this article may have belonged to Ramsey Abbey, a supposition derived from the ram's heads at the fore and stern of the vessel.

It would appear, from the following extracts, that incense has been frequently used in the Church of England since the Reformation :—

1603. Two pounds of frankincense were burnt in the church of Augustine, Farringdon within, London.—Malcolm's *Londinium Redivivum*, ii. 88.

1626. 'Paid for frankincense, 2*d*.'—*Churchwardens' Accounts of Great Wigston, Leicestershire.*

1631. 'The country parson takes order secondly, that the

church be swept and kept clean without dust or cobwebs, and at great festivals strewed and stuck with boughs, and perfumed with incense.'—George Herbert's *Priest to the Temple*, chap. xiii.

Temp. James I. 'A triquertral censer, wherein the clerk putteth frankincense at the reading of the first lesson. The navicula, like the keel of a boat, with a half cover and foot, out of which the frankincense is poured.'—Furniture of Bp. Andrewes's Chapel, *Canterbury's Doom*, p. 122.

Temp. Charles I. 'In Peter House there was on the altar a pot, which they usually called *the incense pot*. . . . A little boat, out of which the frankincense is poured, which Dr. Cosins has made use of in Peter House where he burned incense.'—*Canterbury's Doom*, pp. 74, 123.

Ibid. 'Upon some altars there was a pot called *the incense pot*.'—Neal's *Puritans*, ii. 224.

1683. In the accounts of St. Nicholas, Durham:—'For frankincense at the Bishop's coming, 2*s.* 6*d.*'—Surtees's *Durham*, iv. 52, fol. 1840.

1684. See Evelyn's *Diary*, March 30, 1684.

1760. 'In the coronation procession of George III. appeared the King's groom of the vestry, in a scarlet dress, holding a perfuming pan, burning perfumes, as at previous coronations.'—Thomson's *Coronation of George III.*[1]

Several samples of 'incense prepared for altar service,' as sent out by Mr. Martin of Liverpool, appear to be nothing more than gum olibanum of indifferent quality, and not at all like the composition as especially commanded by God, the form of which is given in full in Exodus, xxx., 34 *sqq.*, which, being religiously adhered to, should consist of stacte, onycha, galbanam, and frank-incense in equal proportions.

The pastils of the moderns are really but a very slight modification of the incense of the ancients. For many years they were called Osselets of Cyprus. When Richard I., at the time of the Crusades, proclaimed himself King of Cyprus, perfumes of various kinds were brought from that Island which has again fallen to the throne of England. In the old books on pharmacy a certain mixture of the then known gum resins was called Suffitus, which being thrown upon hot ashes produced a vapour which was considered to be salutary in many diseases.

[1] R. Hills in *Notes and Queries*.

It is under the same impression that pastils and fumigating ribbon are now used, or at least to cover the *mal odeur* of the sick chamber.

There is not much variety in the formula of the pastils that are now in use; we have first the

Indian or Yellow Pastils.

Santal-wood, in powder		1 lb.
Gum benzoin		1½ „
„ Tolu		¼ „
Otto of santal	of each	3 drachms
„ cassia		
„ cloves		
Nitrate of potass		1½ oz.

Mucilage of tragacantha, *q. s.* to make the whole into a stiff paste.

The bezoin, santal-wood, and Tolu are to be powdered, and mixed by sifting them, adding the ottos. The nitre, being dissolved in the mucilage, is then added. After well beating in a mortar, the pastils are formed in shape with a pastil mould, and gradually dried.

The Chinese josticks are of a similar composition, but contain no Tolu. Josticks are burned as incense in the temples of Booddh in the Celestial Empire, and to such an extent as to greatly enhance the value of santal-wood.

Incense Powders.

Santal-wood powder		1 lb.
Cascarilla bark powder	of each	½ „
Benzoin „		
Vitivert „		2 oz.
Nitrate of potass (saltpetre)		2 „
Grain musk		¼ drachm

Sift the whole well together several times through a fine sieve.

Seraglio Pastils.

The *clous fumants*, seraglio pastils, aromatic pastils, &c., are prepared in various ways. They invariably contain

aromatic powders, resins or balsams, carbon and nitre, the whole compacted by a thick mucilage of gum tragacanth. The following are among the most usual formulæ:—

Sweet-smelling Trochisci, Clous Fumants, Fumigating Pastils.

Benzoin	60 grammes
Balsam of Tolu	8 „
Laudanum	4 „
Santal-wood citrin	15 „
Poplar charcoal	190 „
Nitre	8 „
Mucilage of gum tragacanth	9·5 „

This paste is made up into small cones, which are dried at a low temperature, and are lit at the top.

Perfumers' Pastils.

Well-burned charcoal		1 lb.
Benzoin		¾ „
Tolu, Vanilla pods, Cloves	of each	¼ „
Otto of santal, „ neroli	of each	2 drachms
Nitre		1½ oz.
Mucilage tragacantha		*q. s.*

Piesse's Pastils.

Willow charcoal		½ lb.
Benzoic acid		6 oz.
Otto of thyme, „ caraway, „ rose, „ lavender, „ cloves, „ santal	of each	½ drachm
Grain musk		1 „
Pure civet		¼ „

Prior to mixing, dissolve ¾ oz. nitre in half a pint of distilled or ordinary rose water; with this solution thoroughly wet the charcoal, and then allow it to dry in a warm place.

When the thus nitrated charcoal is quite dry, pour over it the mixed ottos, and stir in the flowers of benzoin. When well mixed by sifting (the sieve is a better tool for mixing powders than the pestle and mortar), it is finally beaten up in a mortar with enough mucilage to bind the whole together, and the less that is used the better.

A great variety of formulæ have been published for the manufacture of pastils; nine-tenths of them contain some woods or bark, or aromatic seeds. Now, when such substances are burned, the chemist knows that if the ligneous fibre contained in them undergoes combustion—the slow combustion—materials are produced which have far from a pleasant odour; in fact, the smell of burning wood predominates over the volatilised aromatic ingredients; it is for this reason alone that charcoal is used in lieu of other substances. The use of charcoal in a pastil is merely for burning, producing, during its combustion, the heat required to quickly volatilise the perfuming material with which it is surrounded. The product of the combustion of charcoal is inodorous, and therefore does not in any way interfere with the fragrance of the pastil. Such is, however, not the case with any ingredients that may be used that are not in themselves perfectly volatile by the aid of a small increment of heat. If combustion takes place, which is always the case with all the aromatic woods that are introduced into pastils, we have, besides the volatilised otto which the wood contains, all the compounds naturally produced by the slow burning of ligneous matter, spoiling the true odour of the other ingredients volatilised.

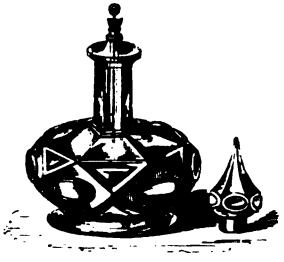
There are, it is true, certain kinds of fumigation adopted occasionally where these products are the materials sought by such fumigation, as when brown paper is allowed to smoulder—*i.e.* undergo slow combustion—in a room for the purpose of covering bad smells. By the quick combustion of tobacco—that is, combustion with flame—there is no odour developed; but by slow combustion, according to the method

adopted by those who indulge in 'the weed,' the familiar aroma of 'the cloud' is generated, and did not exist ready formed in the tobacco. Now a well-made pastil should not develop any odour of its own, but simply volatilise that fragrant matter, whatever it be, used in its manufacture. We think that the fourth formula given above carries out that object.

It does not follow that the formulæ that are here given produce at all times the odour that is most approved; it is evident that in pastils, as with other perfumes, a great deal depends upon taste. Many persons very much object to the aroma of benzoin, while they greatly admire the fumes of cascarilla.

THE PERFUME LAMP.

Shortly after the discovery of the peculiar property of spongy platinum remaining incandescent in the vapour of



PERFUME LAMP.

alcohol, the late Mr. I. Deck, of Cambridge, made a very ingenious application of it for the purpose of perfuming apartments. An ordinary spirit lamp is filled with Hungary water, or other scented spirit, and 'trimmed' with a wick in the usual manner. Over the centre of the wick, and standing about the eighth of an inch above it, a small ball of spongy platinum is

placed, maintained in its position by being fixed to a thin glass rod, which is inserted into the wick.

Thus arranged, the lamp is to be lighted and allowed to burn until the platinum becomes red-hot; the flame may then be blown out; nevertheless the platinum remains incandescent for an indefinite period. The proximity of a red-hot ball to a material of the volatile quality of scented spirit, diffused over a surface of a cotton wick, as a matter of course causes its rapid evaporation, and, as a consequence, the diffusion of odour.

Instead of the lamp being charged with Hungary water, we may use eau de Portugal, verveine, or any other spirituous essence. Several perfumers make a particular mixture for this purpose, which is called

Eau à Brûler.

Hungary water, or eau de Cologne		1 pint
Tincture of benzoin		2 oz.
„ vanilla		1 „
Otto of thyme	of each	½ drachm
„ mint		
„ nutmeg		

Another form, called

Eau pour Brûler.

Rectified spirit		1 pint
Benzoic acid		½ oz.
Otto of thyme	of each	1 drachm
„ caraway		
„ bergamot		2 oz.

Persons who are in the habit of using the perfume lamps will, however, frequently observe that, whatever difference there may be in the composition of the fluid introduced into the lamp, there is a degree of similarity in the odour of the vapour when the platinum is in action. This arises from the fact that, so long as there is the vapour of alcohol mixed with

oxygen air, passing over red-hot platinum, certain definite products always result—namely, acetic acid, aldehyde, and acetal, which are formed more or less,—and impart a peculiar and rather agreeable fragrance to the vapour, but which overpowers any other odour that is present.

FUMIGATING PAPER.

There are two modes of preparing this article :—

1. Take sheets of light cartridge paper, and dip them into a solution of alum—say, alum, one ounce; water, one pint. After they are thoroughly moistened, let them be well dried ; upon one side of this paper spread a mixture of equal parts of gum benzoin, olibanum, and either balsams of Tolu or Peru, or the benzoin may be used alone. To spread the gum, &c., it is necessary that they be melted in an earthenware vessel and poured thinly over the paper, finally smoothing the surface with a hot spatula. When required for use, slips of this paper are held over a candle or lamp, in order to evaporate the odorous matter, but not to ignite it. The alum in the paper prevents it, to a certain extent, from burning.

2. Sheets of good light paper are to be steeped in a solution of saltpetre, in the proportions of two ounces of the salt to one pint of water, to be afterwards thoroughly dried.

Any of the odoriferous gums, as myrrh, olibanum, benzoin, &c., are to be dissolved to saturation in rectified spirit, and with a brush spread upon both sides of the paper ; or the paper may be dipped into the solution spread out in a broad flat dish, and then, being hung up, rapidly dries.

Slips of this paper are to be rolled up as spills, to be ignited, and then to be blown out.

The nitre in the paper causes a continuance of slow combustion, diffusing during that time the agreeable perfume of the odoriferous gums. If two of these sheets of paper be

pressed together before the surface is dry, they will join and become as one. When cut into slips, they form what are called Odoriferous Lighters, or Perfumed Spills.

RIBBON OF BRUGES

For sweet fumigation.



VASE AND SECTION.

Make two tinctures in separate bottles, thus :—

No. 1 Bottle.

Orris tincture	½ pint
Gum benzoin	¼ lb.
Gum myrrh	¾ oz.

No. 2 Bottle.

Alcohol	½ pint
Pod musk	½ oz.
Otto rose	1 drachm

Let both stand one month. Now take 150 yards of undressed cotton tape, and steep it in a solution of one ounce of saltpetre in a pint of hot rose water ; then dry it ; finally, filter the two tinctures, and mix them ; then steep the ribbon into it ; when dry, coil it up, and place it in the vase as depicted above. Draw out an inch of the ribbon, light it, blow out the

flame, and, as it smoulders, a fragrant vapour will rise into the air. When the ribbon has smouldered down to the bottom of the vase-cup it will no longer burn, consequently it spontaneously 'goes out,' which is both advantageous and economical under some circumstances.

I was led to this contrivance from a knowledge of the construction of the Davy Safety Lamp, which prevents fire from passing a small aperture, in consequence of the cooling effect of the surrounding body.

For a certain time new apparatus, called *evaporators*, of

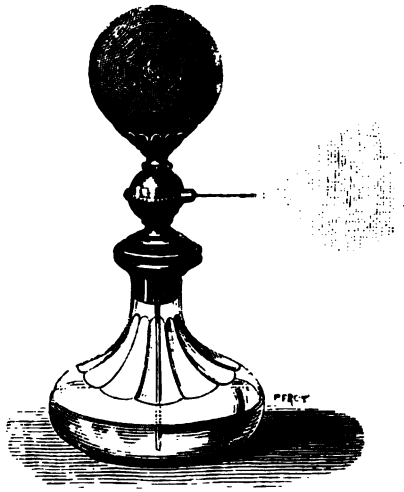


EVAPORATOR.

several kinds have been in use, which, by means of a rapid current of air, diffuse in the atmosphere, in the form of vapour, alcoholic liquids charged with perfume. We shall here give an account of the two kinds of these instruments most commonly used.

The first is adapted for any bottle containing the liquid to be vaporised. It is composed of two glass tubes united by a movable hinge. One of the tubes terminates in a cone with a very small aperture.

In using this apparatus the tubes are placed at right angles to each other; the tube with the conic end is plunged into the bottle so that its lower extremity shall be not far from the bottom of the bottle. Then breathe strongly into the horizontal tube, and, the current of air drawing up the liquid in the bottle by the vertical tube, this gets mixed with the vapourised alcohol, the vehicle of the perfumes contained in the bottle.



EVAPORATOR.

The second apparatus consists of a bottle holding the liquid, and, at the same time, the pulverising arrangement. In this case the object is attained not by a draught, but by means of pressure on the liquid, which rises in the plunger and mixes with a certain quantity of air at the time that pressure is applied to the indiarubber ball forming the top of the apparatus.

This system is to be preferred to the former as more convenient, and as giving a finer division to the vapour.

SECTION X.

PERFUMED SOAP.

THE word Soap, or Sope, from the Greek *sapon*, first occurs in the works of Pliny and Galen. Pliny informs us that soap was first discovered by the Gauls, that it was composed of tallow and ashes, and that the German soap was reckoned the best. According to Sismondi, the French historian, a soap-maker was included in the retinue of Charlemagne. At one time most of the soap used in Europe was made at the little seaport town of Savona, near Genoa, whence the French name of soap, *savon*.

At Pompeii (overwhelmed by an eruption of Vesuvius A.D. 79), a soap-boiler's shop with soap in it was discovered during some excavations made there not many years ago.[1]

From these statements it is evident that the manufacture of soap is of very ancient origin; indeed, Jeremiah figuratively mentions it:—'For though thou wash thee with natron, and take thee much sope, yet thine iniquity is marked before me' (Jer. ii. 22). As does also Malachi:—'He is like a refiner's fire, and like fullers' sope' (Mal. iii. 2).

Mr. Wilson says that the earliest record of the soap trade in England is to be found in a pamphlet in the British Museum, printed in 1641, entitled, 'A Short Account of the Soap Business.' It speaks more particularly about the duty, which was then levied for the first time, and concerning certain patents

[1] Starke's Letters from Italy.

which were granted to persons, chiefly Popish recusants, for some pretended new invention of white soap, 'which in truth was not so.' Sufficient is said here to prove that at that time soap-making was no inconsiderable art.

Prior to the removal of the excise duty upon soap, in 1853, it was a commercial impossibility for a perfumer to *manufacture* soap, because the law did not allow less than one ton of soap to be made at a time—Moritz Becket Bertram, of Hackney, London, being the only exception, to whom a special licence was granted in 1839 for an improved method of manufacture called the cold process of soap-making. This law, which, with certain modifications, had been in force since the reign of Charles I., confined the actual manufacture of that article to the hands of a few capitalists. Such law, however, was but of little importance to the perfumer, as a soap-boiling plant and apparatus is not very compatible with a laboratory of flowers; yet, in some exceptional instances, these excise regulations interfered with him; such, for instance, as that in making soft soap of lard and potash, known, when perfumed, as *Crême d'Amande*; or, unscented, as a Saponaceous Cream, which has, in consequence of that law, been entirely thrown into the hands of our Continental neighbours.

It would be out of place here to enter into the details of soap-making, because perfumers do not manufacture that substance, but are merely 'remelters,' to use a trade term. The dyer purchases his dye-stuffs from the drysalters already fabricated, and these are merely modified under his hands to the various purposes he requires: so with the perfumer; he purchases the various soaps in their raw state from the soap-makers, these he mixes by remelting, then scents and colours according to the article to be produced.

The primary soaps are divided into hard and soft soaps: the hard soaps contain soda as the base; those which are soft are prepared with potash. These are again divisible into

varieties, according to the fatty matter employed in their manufacture, also according to the proportion of alkali. The most important of these to the perfumer is what is termed curd soap, as it forms the basis of all the highly-scented soaps.

CURD SOAP is a nearly neutral soap, of pure soda and fine tallow.

OIL SOAP, as made in England, is an uncoloured combination of olive oil and soda, hard, close grain, and contains but little water in combination.

CASTILE SOAP, as imported from Spain, is a similar combination, but is coloured by protosulphate of iron. The solution of the salt being added to the soap after it is manufactured, from the presence of alkali, decomposition of the salt takes place, and protoxide of iron is diffused through the soap of its well-known black colour, giving the familiar marbled appearance to it. When the soap is cut up into bars, and exposed to the air, the protoxide passes by absorption of oxygen into peroxide; hence, a section of a bar of Castile soap shows the outer edge red-marbled while the interior is black-marbled. Some Castile soap is not artificially coloured but a similar appearance is produced by the use of a barilla or soda containing sulphuret of the alkaline base, and at other times from the presence of an iron salt.

MARINE SOAP is a cocoa-nut-oil soap, of soda, containing a great excess of alkali, and much water in combination.

YELLOW SOAP is a soda soap, of tallow, resin, and lard, &c., &c.

PALM SOAP is a soda soap of palm oil, retaining the peculiar odour and colour of the oil unchanged. The odoriferous principle of palm oil, resembling that from orris-root, can be dissolved out of it by tincturation with alcohol; like ottos generally, it remains intact in the presence of an alkali; hence, soap made of palm oil retains the odour of the oil.

FIG SOFT SOAP is a combination of oils, principally olive oil of the commonest kind, with potash.

NAPLES SOFT SOAP is a fish oil (mixed with Lucca oil) and potash, coloured brown for the London shavers, retaining, when pure, its unsophisticated 'fishy' odour.

The public require a soap that will not shrink and change shape after they purchase it. It must make a profuse lather during the act of washing. It must not leave the skin rough after using it. It must be either quite inodorous, or have a pleasant aroma. None of the above soaps possess all these qualities in union, and, therefore, to produce such an article is the object of the perfumer in his remelting process.

The above soaps constitute the real body or base of all the fancy scented soaps as made by the perfumers, which are mixed and remelted according to the following formula :—

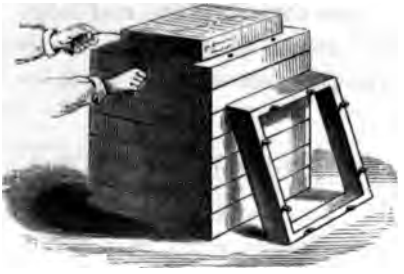
REMELTING SOAP.

The remelting process is exceedingly simple. The bar soap is first cut up into thin slabs, by pressing them against a wire fixed upon the working bench. This cutting wire (piano wire is the kind) is made taut upon the bench by being attached to two screws. These screws regulate the height of the wire from the bench, and hence the thickness of the slabs from the bars. The soap is cut up into thin slabs, because it would be next to impossible to melt a bar whole, on account of soap being one of the worst conductors of heat.

The melting-pan is an iron vessel of various sizes, capable of holding from 28 lbs. to 3 cwt., heated by a steam jacket, or by a water bath. The soap is put into the pan by degrees, or what is, in the vernacular, called 'rounds,'—that is, the thin slabs are placed perpendicularly all round the side of the pan ; a few ounces of water are at the same time introduced, the steam of which assists the melting. The pan being covered

up, in about half an hour the soap will have 'run down.' Another round is then introduced, and so continued every half-hour until the whole 'melting' is finished. The more water a soap contains, the easier is it melted; hence a round of marine soap, or of new yellow soap, will run down in half the time that it requires for old soap.

When different soaps are being remelted to form one kind when finished, the various sorts are to be put into the pan in alternate rounds, but each round must consist only of one kind, to ensure uniformity of condition. As the soap melts, in order to mix it, and to break up lumps, &c., it is from



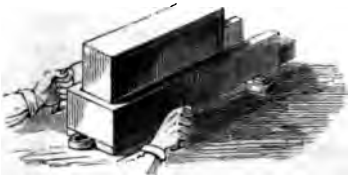
FRAME AND SLAB GAUGE.

time to time '*crutched*.' The 'crutch' is an instrument or tool for stirring up the soap; its name is indicative of its form, a long handle with a short cross—an inverted ⊥ curved to fit the curve of the pan. When the soap is all melted, it is then coloured, if so required, and then the perfume is added, the whole being thoroughly incorporated with the crutch.

The soap is then turned into the 'frame.' The frame is a box made in sections, in order that it can be taken to pieces, so that the soap can be cut up when cold; the sections or 'lifts' are frequently made of the width of the intended bar of soap.

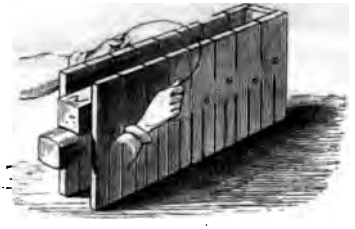
Two or three days after the soap has been in the frame,

it is cool enough to cut into slabs of the size of the lifts or sections of the frame ; these slabs are set up edgeways to cool for a day or two more ; it is then barred by means of a wire. The lifts of the frame regulate the width of the bars ; the gauge regulates their breadth. The density of the soap



BARRING GAUGE.

being pretty well known, the gauges are made so that the soap-cutter can cut up the bars either into fours, sixes, or eights ; that is, either into squares of four, six, or eight to the pound weight. Latterly, various mechanical arrangements have been introduced for soap-cutting, which, in very large establishments, such as those at Marseilles, in France, are



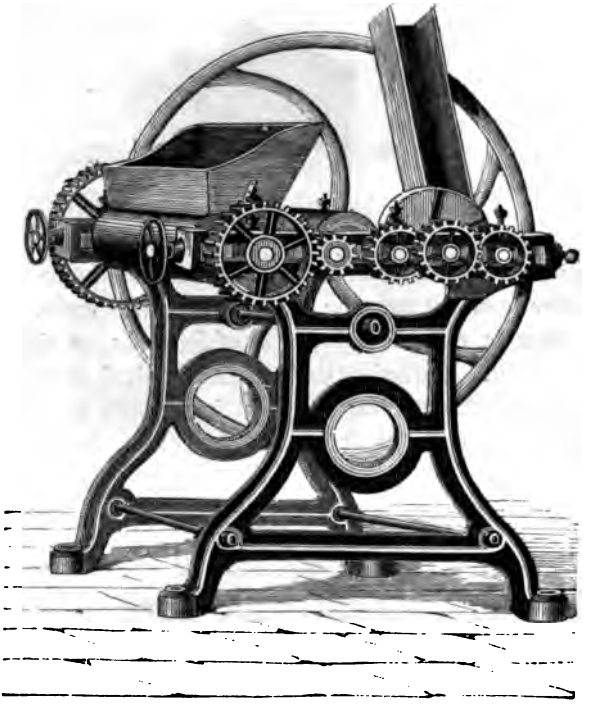
SQUARING GAUGE.

great economisers of labour ; but in England the 'wire' is still used.

The following is a translation from the French edition of this book :—

The grinding machine No. 3 (see fig.) carries three cy-

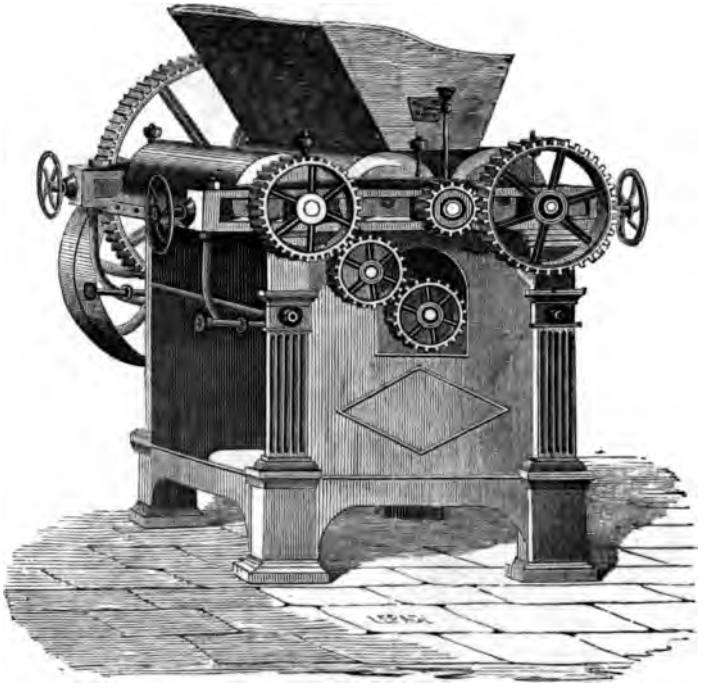
linders of granite, the contact of which is regulated at pleasure. On the right of the plate is a box the upper end of which is raised above the fly-wheel. Into this box the cake of soap, previously cut in the large frame, is introduced. When the machine is in motion, the lower part of the cake



GRINDING-MACHINE. NO. 3.

presses upon a circular knife, and is cut into small pieces, which are received in a box below. The soap thus cut up is placed in the hopper over the first two cylinders (on the left in the figure); and these draw it in and crush it. It is next drawn between the second and third, which, revolving at

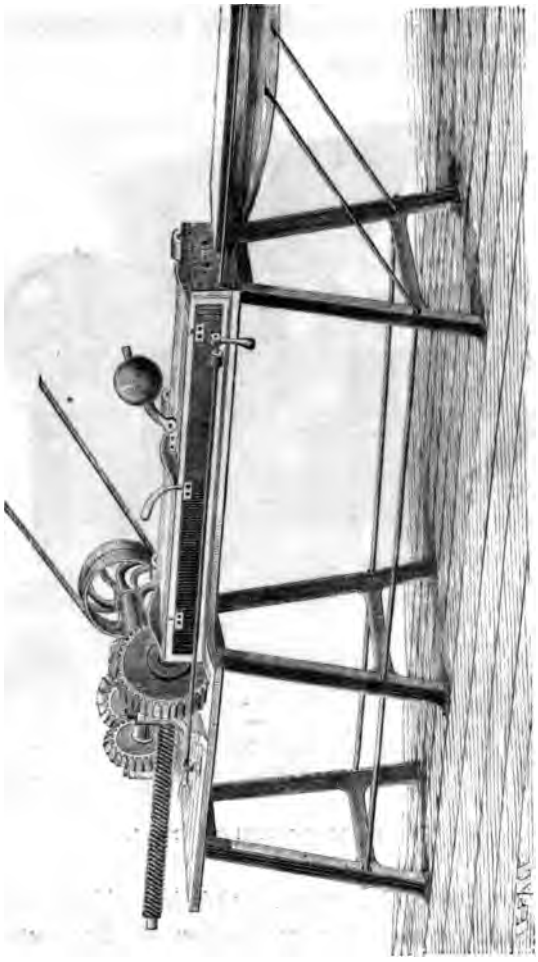
different rates, complete the crushing process. Along the whole breadth of the third cylinder a knife presses and detaches the soap in thin sheets which fall into a box below. By this time the soap is sufficiently ground to be introduced into the rolling-machine.



ROLLING-MACHINE. NO. I.

The machine No. 1' (see fig.) being of larger dimensions, has no knife for preliminary division of the paste. This is effected by a special machine, and the soap is afterwards put into the hopper surmounting the first two cylinders. The work is done by this machine, as by the former, except that

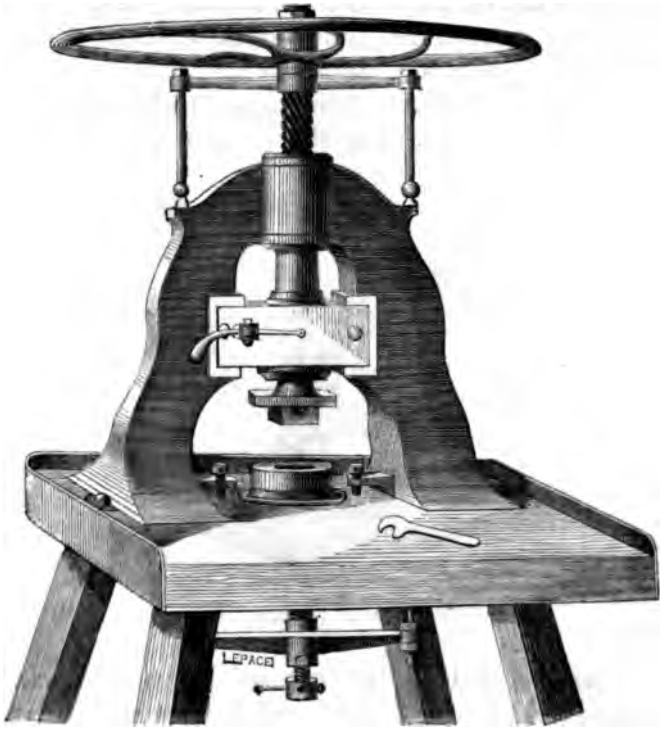
this is worked by steam or other engine, and the former, No. 3, either by hand or by steam.



PELOTEUSE. NO. 1.

The *peloteuse*, No. 1, represented in the figure, is worked exclusively by steam. This machine is composed of a rect-

angular box, the lid of which is made to open for the introduction of the paste. In the box a piston works, exactly fitted to the interior. To the exterior part of the piston is attached a shaft, which receives from the machinery an alternating movement. When the paste is to be introduced into



SOAP PRESS.

the chest, the piston is withdrawn, leaving the chest empty to make room for as much soap as possible. The lid is then closed, and the piston advancing drives back the paste and compresses it with great force. It passes out to the right (of the figure) by an aperture of suitable form and size, which

can be altered at pleasure for the purpose of giving the pats very nearly the shape that is desired. The pats pass out on to a fine endless cloth (right of the figure). When they are of convenient size they are cut by machinery into equal lengths, variable at pleasure, so as to make each cake of any weight desired. When the piston is at the extremity of its course the lid is again opened, the piston drawn back, and the box re-filled. Some kinds of *peloteuses* are worked by hand.

To give the soap the various shapes in which it is sold, the press (see fig.) is used. For this purpose the moulds are in



SOAP PRESS.

two pieces, and on these are engraved the various marks of the manufacturers. The upper part of the mould is fixed to the percussion screw, while the lower part is fastened in a counterpart varying in form according as fixed, or varying weights are wanted. The press is set in motion by a fly-wheel at the top. Automatic stops prevent the motion of the fly-wheel in either direction when the press is not in action, to give time for the removal of the finished cake and the insertion of another. For certain kinds of soap two presses

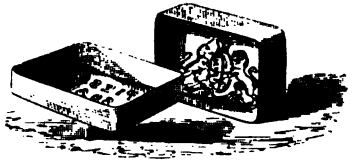
are used; one for roughly giving the shape, the other for perfecting it.

For making tablet shapes, the soap is first cut into squares and is then put into a mould, and finally under a press—a modification of an ordinary die or coin press. Balls are cut by hand, with the aid of a little tool called a 'scoop,' made of brass or ivory, being, in fact, a ring-shaped knife. Balls are



SOAP SCOOP.

also made in the press with a mould of appropriate form. The grotesque form and fruit shape are also obtained by the press and appropriate moulds. The fruit-shaped soaps,



MOULDS.

after leaving the mould, are dipped into melted wax, and are then coloured according to artificial fruit-makers' rules.

The 'variegated' coloured soaps are produced by adding the various colours, such as smalt and vermilion, previously mixed with water, to the soap in a melted state; these colours are but slightly crutched in, hence the streaky appearance or party colour of the soap; this kind is also termed 'marbled' soap.

Toilet soaps are prepared either by a warm or cold process. In this manufacture fats and suets of the highest quality only ought to be used.

The manipulation of toilet soap has of late years made considerable progress, owing to the adoption by some leading perfumers of drying the soap paste before perfuming it, instead of placing the soaps in the stove afterwards.

The chief difficulty in the way of accomplishing this object lay in the operation of making up the paste into balls (*pelotage*). Formerly the moist soap-paste was compressed (*pelotée*) by hand. To effect the proper blending, the paste must also have contained a large quantity of water. Consequently, before it could be offered for sale, it was necessary to leave it in the drying stove for a period varying from six weeks to three months, according to the time of year.

By the substitution of *pelotage* by machinery for that by hand, it is rendered possible to operate on the pastes when dried, or when containing not more than a very small quantity of water, from 10 to 12 per cent., and thus to secure an economy of time and of perfume.

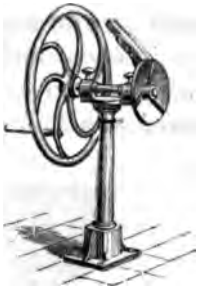
The mechanical operations which the soap-pastes successively undergo for their conversion into toilet soaps are the following :—

1. Reduction to thin chips.
2. Mixture of the perfumes and the colours.
3. Pounding.
4. Making into balls.
5. Stamping.

We intend to describe each of the machines employed in these operations.

1. *Reduction to chips.*—We suppose the slabs of soap to be previously cut up into bars from 4 to 5 centimetres in thickness and placed within reach of the plane. This instrument is composed of a rotating disk, conical or cylindrical in form,

furnished with several blades. It is supported on a column and works either by hand, by means of a crank attached to one of the arms of the fly-wheel, or by steam by means of a pulley attached to the shaft. A slip-board is fixed to the shaft and receives the bar of soap, which descends by its own weight and presses against the plane till it is reduced to chips. When one bar is nearly finished, another is supplied in its place. The operation may be accelerated by pressing with one hand the soap against the plane. The shavings fall into a box placed underneath the disk.



CHIPPING-MACHINE.

2. *Mixture of perfumes and of colours.*—Before perfuming toilet soap with essences of oils and colouring it with various colouring matters, it is dried in a stove till it contains not more than 10 or 12 per cent. of water. The operation of mixing the perfumes with colours is carried on in cases, or better still in the Chevalier fat-mincer.

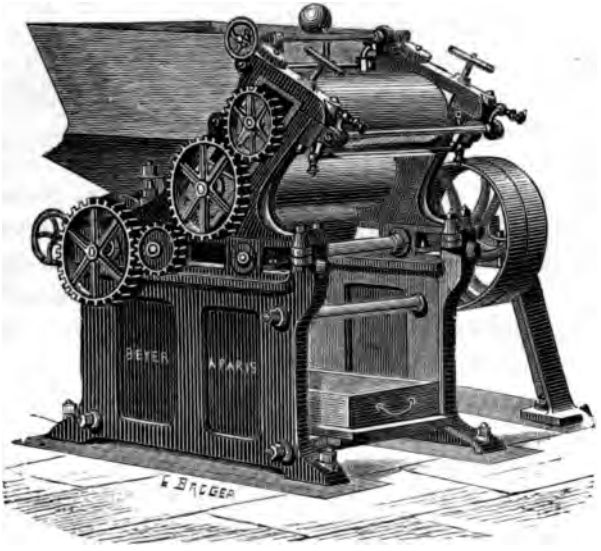
3. *Pounding.*—This process, which was formerly effected with pestle and mortar, is now effected by machinery. The machines are wrought to a very high degree of perfection, and a mixture of the soap with the colouring matter and the perfume, so thorough that every particle of the mixture contains all three substances in the same proportion, and that the paste finally obtained is very soft and very smooth.

The most perfect specimen of pounding-machines now in use is figured on the next page. It is constructed by MM. Beyer Brothers, of Paris.

It consists of two granite cylinders placed horizontally, and two others, also of granite, superimposed obliquely on the second. It is provided with a self-clearing mechanism, so as to allow of being worked without fear of accident. By a

special arrangement a double speed is obtained in the descending movement.

The third portion of the mechanism is placed in the upper part, forming the cap of the cylinder. In the figure the cap is open, and the aperture may be seen by which the soap passes to its exit into the trough. In this aperture is placed a hollow cone of bronze, the object of which is the



BRUNOT'S POUNDING-MACHINE.

division of the soap paste and making it homogeneous before it leaves the machine.

For making the soap into rolls, the piston is made to descend, and the paste is put into the cylinder in small portions, which are pounded by a mechanical stamper. When the cylinder is full of well-compressed soap, the top, which is fixed to it by four strong bolts, is put down. The machine is set in motion, the piston rises, and the soap passes

out by the aperture which has previously been made of the form desired. Long rolls are thus obtained which are afterwards cut into lengths suitable for the moulds.

To certain machines are attached automatic cutters worked by means of gear which receive their motion from the principal.

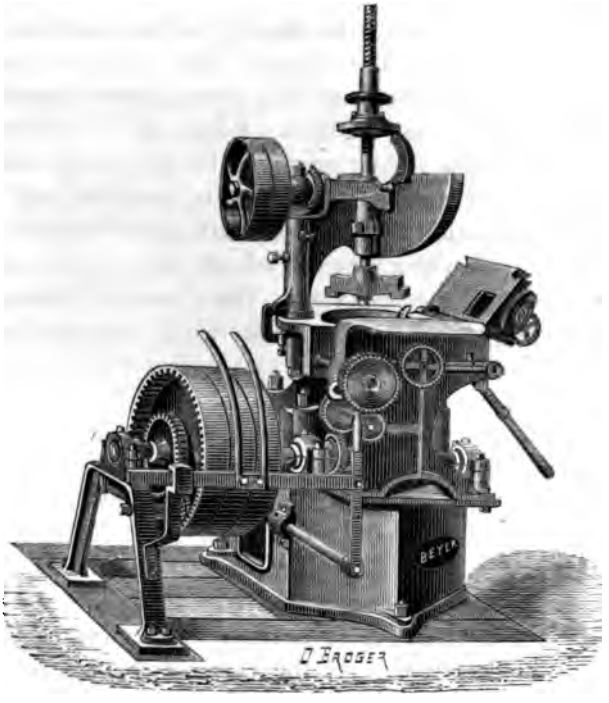
By means of a cavity in the top of the machine, and a double casing about the cylinder, the soap is warmed, which tends to bring the paste to a homogeneous condition.

M. Piver conceived the idea of making use of the hydraulic press for the rolling process. He previously dries his soap by means of a stove constructed of cast-iron and brick. Pulleys set in motion the principal shaft, which transmits the motion by a pinion to a series of wheels and to cylinders in a horizontal and inclined position. The closure is effected by a new system moved by fly-wheels, which act upon endless screws and permit the closure of each cylinder on both sides at once, or separately on one side.

The paste is introduced into the lower part of the wooden hopper, and is first pounded by the horizontal cylinders, which send it up to the inclined cylinders, and the fourth cylinder casts the paste into the upper part of the hopper, which was at the outset loaded in the lower part. The paste accumulated above the hopper afterwards falls into the upper part, and passes once more between the cylinders, till the pounding is completed. At the close of the operation, by means of a screw, a blade is made to press on the third cylinder, and throws the paste into a box placed below. In this way the reloading is automatic, and the constant presence of a workman is not required to watch the process and reload the machine.

4. *Rolling.*—This is effected in various ways. The machine most usually employed, that of Beyer Brothers (see fig.), is composed of three different instruments, namely, in the

upper part the stamper for heaping and mixing up the soap-paste in the cylinder and extracting the air. It is set in motion by a strap, and is intended to take the place of the pounding by hand, which used formerly to be done in marble mortars.



BEYER BROTHERS' ROLLING-MACHINE.

The second important instrument is the piston, wholly of metal, serving as bottom of the cast-iron cylinder into which the soap-paste is put. This piston is moved by a screw and a set of wheels. It rises and falls at pleasure by means of force transmitted through three pulleys, and is over endless

cloths stretched horizontally over rollers which keep them all in motion on the level of a warm current of air.

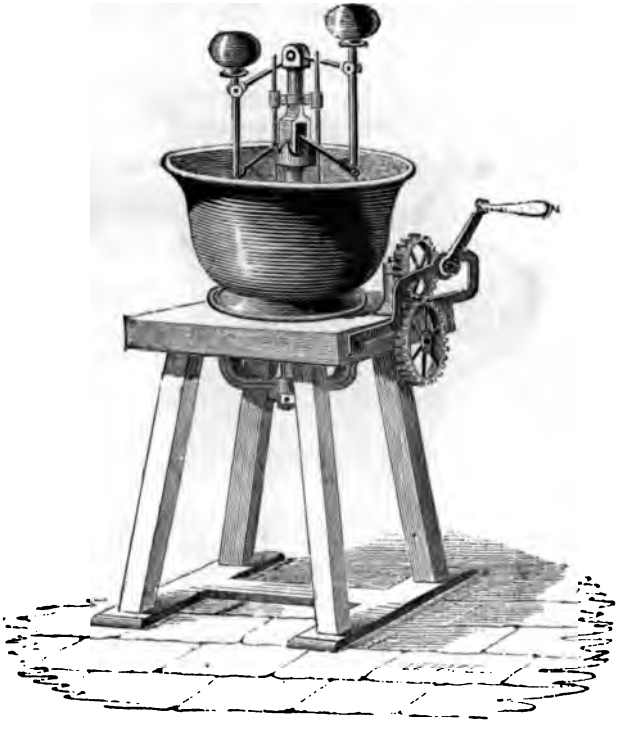
After the pounding, in order to restore to the soap the malleability which it has lost by drying, it is removed to a chopping board heated in the water bath in the condition of paste slightly warmed. The soap is placed in the rolling machine (*modeleuse* or *peloteuse*). This is a hollow cylinder



ROLLING-MACHINE
(*modeleuse*).

with a double casing warmed in the water bath, and closed by a special *obturateur*. A piston adjusted in the interior of the cylinder, and moved from below upwards by a hydraulic press, accumulates the soap against the *obturateur*, drives out the air, and discharges the soap by a screw-plate in long rolls, which are afterwards divided to fit the moulds.

Within very recent times some perfumers and machinists have endeavoured to substitute for these rolling machines, which have the drawback of serving only for a certain quantity of soap (100 kilogrammes at most at the same time) a continuous machine. For this purpose all the machinists employ



PULVERISER.

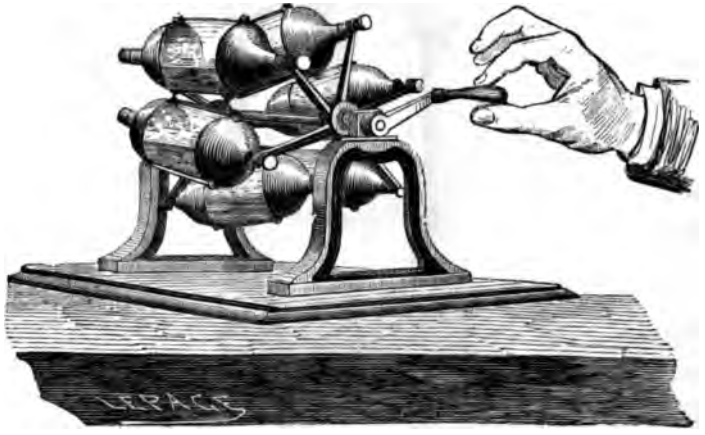
a conical screw Of the apparatus a complete idea is given in the figure.

The soap is put into a hopper placed in the upper part of the machine. It falls thence into a conical screw which draws it on, pressing it towards the screw-plate by which it passes

out. At present the results obtained do not establish the superiority of this machine over the preceding as a compressor, but it is cheaper, and can be worked more readily.

5. *Stamping.*—When the rolls have been divided into small pieces, they are taken to the press, which is identical in all cases, and which we have already described.

M. Chardin-Hadancourt has recently patented a very remarkable method of stamping and wrapping, which has not yet been published. By means of a mould and a special press he wraps the soap in cloth or in leather, which saves it from



MIXER, FOR OIL AND SPIRIT.

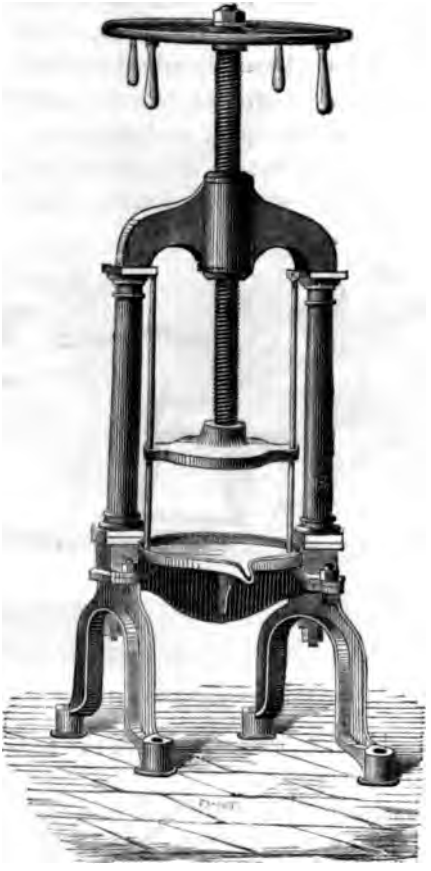
deterioration. He thus dispenses with the tedious and costly process of folding in paper.

All the machines here depicted were seen in motion at the Paris Exhibition, 1878. They are, in fact, but modifications of chocolate machines.

The pulveriser, for fine powders, consists of a mortar within which two pestles, with a circular and alternating movement, exchange places, striking alternately on all parts of the mortar and reducing to powder the substances placed

in it. The mortar is usually surrounded with a leather bag, to prevent the powders being dispersed.

The mixer (see fig.) is composed of cylinders whose axes



EXTRACTION PRESS.

are not in the same plane as the axis of rotation of the machine. By this arrangement the extremities of each cylinder are alternately high and low. When the cylinders

are properly filled with the extracts to be mixed, the machine is set in motion.

The extraction press (see fig.) is used for extracting the juices of various fruits—cucumber, melon, &c.—in a convenient form.

ALMOND SOAP.

This soap, by some persons supposed to be made of sweet almond oil, and by others to be a mystic combination of sweet and bitter almonds, is in reality constituted thus:—

Finest curd soap	1 cwt.
„ oil soap	14 lbs.
„ marine	14 „
Otto of almonds	1½ lb.
„ cloves	¼ „
„ caraway	½ „

By the time that half the curd soap is melted, the marine soap is to be added; when this is well crutched, then add the oil soap, and finish with the remaining curd. When the whole is well melted, and just before turning it into the frame, crutch in the mixed perfume.

Some of the soap houses use Mirabane, or artificial essence of almonds, for perfuming soap, it being far cheaper than the true otto of almonds; much of the cheap soap now sold is scented with Mirabane.

CAMPHOR SOAP.

Curd soap	28 lbs.
Otto of rosemary	1¼ lb.
Camphor	1¼ „

Reduce the camphor to powder by rubbing it in a mortar with the addition of an ounce or more of almond oil, then sift it. When the soap is melted and ready to turn out, add the camphor and rosemary, using the crutch for mixing.

HONEY SOAP.

Best yellow soap	1 cwt.
Fig soft soap	14 lbs.
Otto of citronella	1½ „
Saffron	1 oz.

WHITE WINDSOR SOAP.

Curd soap	1 cwt.
Marine soap	21 lbs.
Oil soap	14 „
Otto of caraway	1½ „
„ thyme, „ rosemary	of each 1½ „
„ cassia, „ cloves	of each ¼ „

BROWN WINDSOR SOAP.

Curd soap	¾ cwt.
Marine soap	¼ „
Yellow soap	¼ „
Oil soap	¼ „
Brown colouring (caramel)	½ pint
Otto of caraway, „ cloves, „ thyme, „ cassia, „ petit grain, „ French lavender	of each 12 oz.

SAND SOAP.

Curd soap	7 lbs.
Marine soap	7 „
Sifted silver sand	28 „
Otto of thyme, „ cassia, „ caraway, „ French lavender	of each 2 oz.

FULLER'S EARTH SOAP.

Curd soap	10½ lbs.
Marine soap	3½ „
Fuller's earth (baked)	14 „
Otto of French lavender	2 oz.
„ origanum	1 „

The above forms are indicative of the method adopted for perfuming soaps while hot or melted.

All the very highly scented soaps are, however, perfumed cold, in order to avoid the loss of scent, twenty per cent. of perfume being evaporated by the hot process.

The variously named soaps, from the sublime 'Sultana' to the ridiculous 'Turtle's Marrow,' we cannot of course be expected to notice; the reader may, however, rest assured that he has lost nothing by their omission.

The receipts given produce only the finest quality of the article named. Where cheap soaps are required, not much acumen is necessary to discern that by omitting the expensive perfumes, or lessening the quantity, the object desired is attained. Still lower qualities of scented soap are made by using greater proportions of yellow soap, and employing a very common curd, omitting the oil soap altogether.

SCENTING SOAPS HOT.

In the previous remarks, the methods explained of scenting soap involved the necessity of melting it. The high temperature of the soap under these circumstances involves the obvious loss of a great deal of perfume by evaporation. With very highly scented soaps, and with perfume of an expensive character, the loss of ottos is too great to be borne in a commercial sense; hence the adoption of the plan of

SCENTING SOAPS COLD.

This method is exceedingly convenient and economical for scenting small batches, involving merely mechanical labour, the tools required being simply an ordinary carpenter's plane and a good marble mortar and lignum vitæ pestle.

The woodwork of the plane must be fastened at each end, so that when placed over the mortar it remains firm and is not easily moved by the parallel pressure of the soap against its projecting blade.

To commence operations, we take first 7 lbs., 14 lbs., or 21 lbs. of the bars of the soap that it is intended to perfume.



SOAPING THE PLANE.

The plane is now laid upside down across the top of the mortar.

Things being thus arranged, the whole of the soap is to be pushed across the plane until it is all reduced into fine shavings. Like the French 'Charbonnier,' who does not saw the wood, but woods the saw, so it will be perceived that in this process we do not plane the soap, but that we soap the plane, the shavings of which fall lightly into the mortar as quickly as produced.

Soap, as generally received from the maker, is in proper condition for thus working; but if it has been in stock any

time it becomes too hard, and must have from one to three ounces of distilled water sprinkled in the shavings for every pound of soap employed, and must lie for at least twenty-four hours to be absorbed before the perfume is added.

When it is determined what size the cakes of soap are to be, what they are to sell for, and what it is intended they should cost, then the maker can measure out his perfume.

In general, soaps scented in this way retail from 4*s.*, 10*s.*, to 20*s.* per pound. When finished, they in truth are the only soaps fit for state apartments. The soap, being in a proper condition with regard to moisture, &c., is now to have the perfume well stirred into it. The pestle is then set to work for the process of incorporation. After a couple of hours of 'warm exercise,' the soap is generally expected to be free from streaks, and to be of one uniform consistence.

For perfuming soap in large portions by the cold process, instead of using the pestle and mortar as an incorporator, it is more convenient and economical to employ a mill similar in construction to a cake chocolate-mill, or a flake cocoa-mill; any mechanical apparatus that answers for mixing paste and crushing lumps will serve pretty well for blending soap together.[1]

Before being put into the mill, the soap is to be reduced to shavings, and have the scent and colour stirred in; after milling it, the flakes or ribands of soap are to be finally bound together by the pestle and mortar into one solid mass; it is then weighed out in quantities for the tablets required, and moulded by the hand into egg-shaped masses; each piece being left in this condition, separately laid in rows on a sheet of white paper, dries sufficiently in a day or so to be fit for the press, which is the same as that previously mentioned. It is usual, before placing the cakes of soap in the press, to

[1] See the description of M. Brunot's Pounding Machine, which is the most generally adopted.

dust them over with a little starch-powder, or else to very slightly oil the mould ; either of these plans prevents the soap from adhering to the letters or embossed work of the mould —a condition essential for turning out a clean, well-struck tablet.

The body of all the fine soaps mentioned below should consist of the finest and whitest curd soap, or of a soap previously melted and coloured to the required shade, thus:—

ROSE-COLOURED SOAP is curd soap stained with rose and aniline, thoroughly incorporated when the soap is melted, and not very hot.

GREEN SOAP is a mixture of palm-oil soap and curd soap, to which is added a little yellow derived from saffron water and strained.

BLUE SOAP, curd soap coloured with smalt.

BROWN SOAP, curd soap with caramel, *i.e.* burnt sugar.

MAUVE SOAP is coloured with aniline.

The intensity of colour varies, of course, with the quantity of colouring.

Some kinds of soap become coloured or tinted to a sufficient extent by the mere addition of the ottos used for scenting, such as 'spermaceti soap,' 'lemon soap,' &c., the latter of which becomes of a beautiful pale lemon colour by the mere mixing of the perfume with the curd soap. (See Colours, Section XIX.)

OTTO OF ROSE SOAP.

(*To retail at* 10*s. per pound.*)

Curd soap (previously coloured pink) . . .	4½ lbs.
Otto of rose	1 oz.
Spirituous extract of musk	2 „
Otto of santal	¼ „
„ geranium	¼ „

Mix the perfumes, stir them in the soap shavings, and beat together.

TONQUIN MUSK SOAP.

Pale brown-coloured curd soap	5 lbs.
Grain musk	¼ oz.
Otto of bergamot	1 „

Rub the musk with the bergamot, then add it to the soap, and beat up. Should be made six months before sold.

ORANGE-FLOWER SOAP.

Curd soap	7 lbs.
Otto of neroli	3½ oz.

SANTAL-WOOD SOAP.

Curd soap	7 lbs.
Otto of santal	7 oz.
„ bergamot	2 „

SPERMACETI SOAP.

Curd soap	14 lbs.
Otto of bergamot	2½ „
„ lemon	½ „

CITRON SOAP.

Curd soap	6 lbs.
Otto of citron zeste	¾ „
„ verbena (lemon grass)	½ oz.
„ bergamot	4 „
„ lemon	2 „

One of the best of fancy soaps that is made.

FRANGIPANNI SOAP.

Curd soap (previously coloured pink)	7 lbs.
Civet	¼ oz.
Otto of neroli	½ „
„ santal	1½ „
„ rose	¼ „
„ vitivert	½ „

Rub the civet with the various ottos, mix, and beat in the usual manner.

PATCHOULI SOAP.

Curd soap	4½ lbs.
Otto of patchouli	1 oz.
„ santal, vitivert (of each)	¼ „

SAPONACEOUS CREAM OF ALMONDS.

The preparation sold under this title is a potash soft soap of lard. It has a beautiful pearly appearance, and has met with extensive demand as a shaving soap. Being also used in the manufacture of EMULSINES, it is an article of no inconsiderable consumption by the perfumer. It is made thus :—

Clarified lard	7 lbs.
Potash ley (containing 26 per cent. of caustic potash)	3¾ „
Rectified spirit	3 oz.
Otto of almonds	2 drachms

Manipulation.—Melt the lard in a porcelain vessel by a salt-water bath, or by a steam heat under 15 lbs. pressure : then run in the ley *very slowly*, agitating the whole time. When about half the ley is in, the mixture begins to curdle ; it will, however, become so firm that it cannot be stirred. The

crême is then finished, but is not pearly; it will, however, assume that appearance by long trituration in a mortar, gradually adding the alcohol, in which has been dissolved the perfume.

SOAP POWDERS.

These preparations are sold sometimes as a dentifrice and at others for shaving; they are made by reducing the soap into shavings by a plane, then thoroughly drying them in a warm situation, afterwards grinding in a mill, then perfuming with any otto desired.

KYPOPHAGON SOAP.

Best yellow soap)
Fig soft soap) equal parts melted together.

Perfume with anise and citronella.

AMBROSIAL CREAM.

Colour the grease very strongly with alkanet root, then proceed as for the manufacture of saponaceous cream. The cream coloured in this way has a blue tint: when it is required of a purple colour, we have merely to stain the white saponaceous cream with aniline to the shade desired. Perfume with otto of English peppermint.

NAPLES SHAVING SOAP.

This article is very much used, and as a consequence is in demand: it can be perfumed either with otto of thyme, lavender, peppermint, or rose. Being very rank, it requires a great deal of perfume to cover its fishy odour, being made, as I believe, from fish oils and potash; but M. Faiszt states that

it is made by saponifying mutton fat with lime, and then separating the fatty acids from the soap thus formed, by means of a mineral acid. These fatty acids are afterwards combined with ordinary caustic potash to produce the Naples soap.

TRANSPARENT SOFT SOAP.

Solution caustic potash ('London Pharmacopœia')	6 lbs.
Olive oil	1 lb.

Perfume to taste.

Before commencing to make the soap, reduce the potash ley to one-half its bulk by continued boiling. Now proceed as for the manufacture of saponaceous cream. After standing a few days, pour off the waste liquor.

SOFT WATER ELIXIR.

(*For softening hard water.*)

Spirits of wine	1 gallon
Orange-flower water	4 pints
Marine soap	7 lbs.

Colour with a few drops of aniline. Shave up the soap and put it into the water; make it hot, and the soap will dissolve; then add the spirit.

A table spoonful of this elixir put into the bottom of a basin will completely 'soften' the water that is put into it for washing.

GLYCERINE SOAP.

Soaps, particularly curd soap, dissolve in warm glycerine; when cold the soap sets like a jelly, or, 'firm as a rock,' according to the proportions of soap used. It is semi-transparent, and can be perfumed at cost or pleasure thus:—

For every hundred pounds of soap made add :—

Otto of petit grain . .	of each . .	10 oz.
„ geranium . .		
„ lime . . .		
„ nutmeg . .	„ . .	5 „
„ citronella . .		

TRANSPARENT HARD SOAP.

Reduce the soap to shavings, and dry them as much as possible ; then dissolve in alcohol, using as little spirit as will effect the solution ; then colour and perfume as desired, and cast the product in appropriate moulds ; finally dry in a warm situation.

Until the Legislature allows spirit to be used, for manufacturing purposes, free of duty, we cannot compete with our neighbours in this article : the methylated spirit has such an abominable odour that it cannot be used for making scented soaps for the toilet.

TRANSPARENT GLYCERINE SOAP.

This soap is now in great vogue ; it is made by the cold process under the usual conditions. A third of the weight of the soap is then added to a quart of alcohol, and it is heated in the water-bath. In about ten or fifteen minutes, the soap is completely dissolved in the alcohol and the glycerine ; it is strained into bladders, then cut into small pieces and taken to the drying stove, where it remains till the alcohol is completely evaporated, which takes about twenty to twenty-five days. When dry it is stamped in the common press.

MEDICATED SOAPS.

In 1850 I began making a series of medicated soaps, such as SULPHUR SOAP, IODINE SOAP, BROMINE SOAP, CREO-

SOTE SOAP, MERCURIAL SOAP, CROTON OIL SOAP, and many others. These soaps are prepared by adding the medicant to curd soap, and then making in a tablet form for use. For sulphur soap, the curd soap may be melted, and flowers of sulphur added while the soap is in a soft condition. For antimony soap and mercurial soap, the low oxides of the metals employed may also be mixed in the curd soap in a melted state. Iodine, bromine, creosote soap, and others, containing very volatile substances, are best prepared cold by shaving up the curd soap in a mortar, and mixing the medicant with it by long beating.

In certain cutaneous diseases the author has reason to believe that they will prove of infinite service as auxiliaries to the general treatment. It is obvious that the absorbent vessels of the skin are very active during the lavatory process; such soap must not, therefore, be used except by the special advice of a medical man. Probably these soaps will be found useful for internal application. The precedent of the use of Castile soap (containing oxide of iron) renders it likely that such soaps will find a place in the pharmacopœias. The discovery of the solubility, under certain conditions, of the active alkaloids, quinine, morphia, &c., in oil, by Mr. W. Bastick, greatly favours the supposition of analogous compounds in soap.

Some forty or fifty years ago, there were several kinds of soap imported, but which now-a days are quite unknown, such as Joppa soap, Smyrna soap, Jerusalem soap, Genoa soap, Alicant soap, &c., nearly all of which, however, were made of oil as a base.

The sale of medicated soaps, which in England can be made by perfumers, where the trade of druggist is free, would not be allowed in France. Such preparations come within the domain of pharmacy; and any soap or other cosmetic, offered as possessing therapeutic properties, is a medicine

and not a cosmetic. It must therefore in France be subject to the legal regulations for the sale of medicines.[1]

JUNIPER TAR SOAP.

This soap is made from the tar of the wood of the *Juniperus communis*, by dissolving it in a fixed vegetable oil, such as almond or olive oil, or in fine tallow, and forming a soap by means of a weak soda ley after the customary manner. This yields a moderately firm and clear soap, which may be readily used by application to parts affected with eruptions, at night, mixed with a little water, and carefully washed off the following morning. This soap has lately been much used for eruptive disorders, particularly on the Continent, and with varying degrees of success. It is thought that the efficient element in its composition is a rather less impure hydrocarburet than that known in Paris under the name *huile de cade.* On account of its ready miscibility with water, it possesses great advantage over the common tar ointment.

SOAPSTONE OF MYLOS.

This is an important article of commerce in Turkey and Russia, where it is used as soap. It has been analysed by M. Landerer, the result being—silex, 63; alumina, 23; water, 12; and sesquioxide of iron, 1.25. This mineral is of a greyish colour, and has schistose fracture. It can be cut into shavings, and adheres a little to the tongue; softens in water, dissolving gradually in it; and afterwards becomes white and greasy to the touch. It becomes grey again after desiccation.

[1] Guibourt's *Manuel légal des Pharmaciens*, Paris, 1852, may be consulted on this subject.

SOAP PLANTS.

There are several plants the juices of which are employed for washing; but at present they have no practical application to the toilet, though doubtless they will have so soon as we can obtain a regular supply.

The soapwort (*Saponaria officinalis*), the Egyptian soapwort (*Gypsophilla struthium*, L., or *strution* of Dioscorides and *Kalvagi* of the Arabs), and the bark of *punama* or of *quillaye* (*Sapindus saponaria*) are extremely rich in a proximate principle named *saponine*, which has the property of softening water. These plants or parts of them form what are called the vegetable soaps. They are used not only in the toilet, but for cleansing stuffs, especially silks.

Saponine, discovered by M. Bussy in the Egyptian soapwort, is white and non-crystallisable. Its taste, sweet at first, soon turns acid and astringent; it provokes sneezing; it dissolves in water in any proportion, and its solution makes a lather like soap and water.

SECTION XI.

EMULSINES.

FROM soaps proper we now pass to those compounds, used as substitutes for soap, which are classed together under one general title as above, for the reason that all cosmetics herein embraced have the property of forming emulsions (milks) with water.

Chemically considered, they are an exceedingly interesting class of compounds, and are well worthy of study. Being prone to decomposition, as might be expected from their composition, they should be made only in small portions, or, at least, only in quantities to meet a ready sale.

While in stock they should be kept as cool as possible, and free from a damp atmosphere.

AMANDINE.

Fine almond oil	7 lbs.
Simple syrup[1]	4 oz.
White soft soap, or saponaceous cream, *i.e.* Crême d'Amande	1 „
Otto of almonds	1 „
„ bergamot	1 „
„ cloves	½ „

Rub the syrup with the soft soap until the mixture is homogeneous; then rub in the oil by degrees, the perfume having been previously mixed with the oil.

[1] Simple syrup consists of 3 lbs. of loaf sugar, boiled for a minute in 1 imperial pint of distilled water.

In the manufacture of amandine (and olivine) the difficulty is to get in the quantity of oil indicated, without which it does not assume that transparent jelly appearance which good amandine should have. To attain this end, the oil is put into a 'runner'—that is, a tin or glass vessel—at the bottom of which is a small faucet and spigot, or tap. The oil, being put into this vessel, is allowed to run slowly into the mortar in which the amandine is being made, just as fast as the maker finds that he can incorporate it with the paste of soap and syrup; and so long as this takes place, the result will always have a jelly texture to the hand. If, however, the



OIL-RUNNER IN EMULSINE PROCESS.

oil be put into the mortar quicker than the workman can blend it with the paste, then the paste becomes 'oiled,' and may be considered as 'done for;' unless, indeed, the whole process be gone through again, starting off with fresh syrup and soap, using up the greasy mass as if it were pure oil. This liability to 'go off' increases as the amandine nears the finish; hence extra caution and plenty of 'elbow grease' must be used during the addition of the last two pounds of oil. If the oil be not perfectly fresh, or if the temperature of the atmosphere be above the average of summer heat, it will be almost impossible to get the whole of the oil given in the formula into combination. When the mass becomes bright

and of a crystalline lustre, it will be well to stop the further addition of oil to it.

This and similar compounds should be potted as quickly as made, and the lids of the pots banded either with strips of tin-foil or paper, to exclude air. When the amandine is filled into the jars, the top or face of it is marked or ornamented with a tool made to the size of half the diameter of the interior of the jar, in a similar way to a saw; a piece of lead or tortoise-shell, being serrated with an angular file, or piece of an old saw, will do very well; place the marker on the amandine, and turn the jar gently round.

OLIVINE.

Gum acacia, in powder	2 oz.
Honey	6 „
Yolk of eggs	in number 5
White soft soap	3 „
Olive oil	2 lbs.
Green oil	1 oz.
Otto of bergamot	1 „
„ lemon	1 „
„ clove	½ „
„ thyme and cassia	each ½ drachm

Rub the gum and honey together until incorporated, then add the soap and egg. Having mixed the green oil and perfumes with the olive oil, the mixture is to be placed in the runner, and the process followed exactly as indicated for amandine.

HONEY AND ALMOND PASTE.

Bitter almonds, blanched and ground	½ lb.
Honey	1 „
Yolk of eggs	in number 8
Almond oil	1 „
Otto of bergamot	¼ oz.
„ cloves	¼ „

Rub the eggs and honey together first, then gradually add the oil, and finally the ground almonds and the perfume.

ALMOND PASTE.

Bitter almonds, blanched and ground . . .	1½ lb.
Rose-water	1½ pint
Alcohol (60 over proof)	16 oz.
Otto of bergamot	5 „

Place the ground almonds and one pint of the rose-water into a stew-pan : with a slow and steady heat, cook the almonds until their granular texture assumes a pasty form, constantly stirring the mixture during the whole time ; otherwise the almonds quickly burn to the bottom of the pan, and impart to the whole an empyreumatic odour.

The large quantity of otto of almonds which is volatilised during the process, renders it essential that the operator should avoid the vapour as much as possible.

When the almonds are nearly cooked, the remaining water is to be added ; finally, the paste is put into a mortar, and well rubbed with the pestle ; then the perfume and spirit are added. Before potting this paste, as well as honey paste, it should be passed through a medium fine sieve, to ensure uniformity of texture, especially as almonds do not grind kindly.

A more satisfactory result is to be obtained by the following process :—

Put into a mill some bitter almonds, previously peeled. When well crushed, soak with rose-water, or any aromatic water ; then boil so as to evaporate part of the water, and to bring off a slight smell of bitter almonds. When the paste is dried it should be pretty firm. It is then to be diluted with the requisite quantity of alcohol, at the same time straining it through a hair sieve. The perfume is afterwards added.

Other pastes, such as *Pâte de Pistache*, *Pâte de Cocos*, *Pâte de Guimauve*, are prepared in so similar a manner to the above, that it is unnecessary to say more about them here, than that they must not be confounded with preparations bearing a similar name made by confectioners.

ALMOND MEAL.

Ground almonds	1 lb.
Wheat flour	1 „
Orris-root powder	¼ „
Otto of lemon	½ oz.
„ almonds	¼ drachm

PISTACHIO NUT MEAL, OR ANY OTHER NUT.

Pistachio nuts (decorticated as almonds are blanched)	1 lb.
Orris powder	1 „
Otto of neroli	1 drachm
„ lemons	½ oz.

Other meals, such as perfumed oatmeal, perfumed bran, &c., are occasionally in demand, and are prepared as the foregoing.

All the preceding preparations are used at the washhand-stand as substitutes for soap, and to 'render the skin pliant, soft, and fair!'

EMULSIN AU JASMIN.

Saponaceous cream	1 oz.
Simple syrup	1½ „
Almond oil	1 lb.
Best jasmine oil	½ „

EMULSIN A LA VIOLETTE.

Saponaceous cream	1 oz.
Syrup of violets	1½ „
Best violet oil	1½ lb.

Emulsin of other odours can be prepared with tubereuse, rose, or cassie (acacia) oils—oils that have been perfumed by the enfleurage or maceration process.

For the methods of mixing the ingredients, see 'Amandine.'

On account of the high price of the French oils, these preparations are expensive, but they are undoubtedly the most exquisite of cosmetics.

GLYCERINE JELLY.

White soft soap	4 oz.
Pure glycerine	6 „
Almond oil	3 lbs. in summer
	4 „ in winter
Otto of thyme	2 drachms

Mix the soap and glycerine in a mortar, then gradually add the oil in the same way as for amandine.

SECTION XII.

MILKS, OR EMULSIONS.

IN the perfumery trade, few articles meet with a more ready sale than that class of cosmetics denominated milks. It has long been known that nearly all the seeds of plants which are called nuts, when decorticated and freed from their pellicle, on being reduced to a pulpy mass, and rubbed with about four times their weight of water, produce a fluid which has every analogy to cow's milk. The milky appearance of these emulsions is due to the minute mechanical division of the oil derived from the nuts being diffused through the water. All these emulsions possess great chemical interest on account of their rapid decomposition, and the products emanating from their fermentation, especially that made with sweet almonds and pistachios (*Pistachia vera*).

In the manufacture of various milks for sale, careful manipulation is of the utmost importance, otherwise these emulsions 'will not keep;' hence more loss than profit.

'Transformation takes place in the elements of vegetable caseine (existing in seeds) from the *very moment* that sweet almonds are converted into almond-milk.' (LIEBIG.) This accounts for the difficulty many persons find in making milk of almonds that does not spontaneously divide a day or so after its manufacture.

Pure water is 'the cosmetic' *par excellence*; but water, though all-sufficient during perfect health, is most insufficient for the inhabitants of towns, because their health is rarely

perfect, assailed as it is by business cares, heated rooms, ill-ventilated public buildings and places of amusement, and by a sulphurous atmosphere, charged with the products of combustion of gas and coal. It is therefore necessary that Art should come to the aid of Nature, from whom we are too apt to demand more than she can give. In the open air, no less than within doors, in walking, at balls or parties, at places of public resort, in watching, and various kinds of occupation, the skin of the face becomes charged with impurities which plain water will not remove. To restore the skin to its freshness, to correct the evils of town life. and to impart to the skin the bloom of health, no cosmetic can approach Emulsion of Roses. It cleanses, softens, and brightens the skin, yet is as harmless as an April shower on the verdure of spring. In the manufacture of Emulsion or Milk of Roses careful manipulation is of the utmost importance.

MILK OF ROSES.

Valentia almonds (blanched)	½ lb.
Rose-water	1 quart
Alcohol (60 over proof)	¼ pint
Otto of rose	1 drachm
White wax, spermaceti, oil soap . . each	½ oz.

Manipulation.—Shave up the soap, and place it in a vessel that can be heated by steam or water bath; add to it two or three ounces of rose-water. When the soap it perfectly melted, add the wax and spermaceti, without dividing them more than is necessary to obtain the correct weight: this ensures their melting slowly, and allows time for their partial saponification by the fluid soap; occasional stirring is necessary. While this is going on, blanch the almonds, carefully excluding every particle that is in the least way damaged. Now proceed to beat up the almonds in a scrupulously clean mortar, allowing the rose-water to trickle into the mass by

degrees; the runner, as used for the oil in the manufacture of olivine and amandine, is very convenient for this purpose. When the emulsion of almonds is thus finished, it is to be strained, *without pressure*, through clean *washed* muslin (*new* muslin often contains starch, flour, gum, or dextrine).

The previously-formed saponaceous mixture is now to be placed in the mortar, and the ready formed emulsion in the runner; the soapy compound and the emulsion are then carefully blended together. As the last of the emulsion runs into the mortar, the spirit, in which the otto of roses has been dissolved, is to take its place, and to be *gradually* trickled into the other ingredients. A too sudden addition of the spirit frequently coagulates the milk, and causes it to be curdled. As it is, the temperature of the mixture rises, and every means must be taken to keep it down; the constant agitation and cold mortar effecting that object pretty well. Finally, the now formed milk of roses is to be strained.

The almond residue may be washed with a few ounces of fresh rose-water, in order to prevent any loss in bulk to the whole given quantity. The newly formed milk should be placed into a bottle having a tap in it about a quarter of an inch from the bottom. After standing perfectly quiet for twenty-four hours it is fit to bottle. All the above precautions being taken, the milk of roses will keep any time without precipitate or creamy supernatation. These directions apply to all other forms of milk now given.

MILK OF ALMONDS.

Bitter almonds (blanched)	10 oz.
Distilled (or rose) water	1 quart
Alcohol (60 over proof)	¾ pint [1]
Otto of almonds	¼ drachm
„ bergamot	2 drachms
Wax, spermaceti, almond oil, curd soap .	each ½ oz.

[1] The imperial measure only is recognised among perfumers.

MILK OF ELDER.

Sweet almonds		4 oz.
Elder-flower water		1 pint
Alcohol (60 over proof)		8 oz.
Oil of elder-flowers, prepared by maceration		½ „
Wax, sperm, soap	each	½ „

MILK OF DANDELION.

Sweet almonds		4 oz.
Rose-water		1 pint
Expressed juice of dandelion root		1 oz.
Esprit de tubereuse		8 „
Green oil, wax, curd soap	each	½ „

Let the juice of the dandelion be perfectly fresh pressed ; as it is in itself an emulsion, it may be put into the mortar after the almonds are broken up, and stirred with the water and spirit in the usual manner.

MILK OF CUCUMBER.

Sweet almonds		4 oz.
Expressed juice of cucumbers		1 pint
Spirit (60 over proof)		8 oz.
Essence of cucumbers		¼ pint
Green oil, wax, curd soap	each	¼ oz

Raise the juice of the cucumbers to the boiling point for half a minute, cool it as quickly as possible ; then strain through fine muslin : proceed to manipulate in the usual manner.

MILK OF PISTACHIO NUTS.

Pistachio nuts		3 oz.
Orange-flower water		3¼ pints
Esprit neroli		¾ „
Palm soap, green oil, wax, spermaceti	each	1 oz.

LAIT VIRGINAL.

Rose-water		1 quart
Tincture Tolu		½ oz.

Add the water very slowly to the tincture ; by so doing an opalescent milky fluid is produced, which will retain its consistency for many years. By reversing this operation, pouring the tincture into the water, a cloudy precipitate of the resinous matter ensues, which does not again become readily suspended in the water.

In France this Lait Virginal is most commonly made with tincture of benzoin.

EXTRACT OF ELDER FLOWERS.

Elder-flower water	1 quart
Tincture benzoin	1 oz.

Manipulate as for Lait Virginal.

Similar compounds may, of course, be made with orange-flower and other waters.

GLYCERINE LOTION.

Orange-flower water	1 gallon
Glycerine	8 oz.
Borax	1 „

Dr. Startin states that this is an excellent cosmetic.

Pure glycerine is now extensively used as a remedy for chapped lips, and a very useful material it is ; however, being 'sticky,' it is very unpleasant to many people, who give preference to the glycerine jelly.

Pure glycerine is also used as a sort of bandoline, and for making the hair glossy. Scented with otto of geranium or rose, and tinted with aniline, it is now sold under the name of mauve oil.

SECTION XIII.

COLD CREAM.

GALEN, the celebrated physician of Pergamus, in Asia, but who distinguished himself at Athens, Alexandria, and Rome, about 1,700 years ago, was the inventor of that peculiar unguent, a mixture of grease and water, which is now distinguished as cold cream in perfumery, and as *Ceratum Galeni* in pharmacy.

The modern formula for cold cream is, however, quite a different thing to that given in the works of Galen, in point of odour and quality, although substantially the same—grease and water. In perfumery there are several kinds of cold cream, distinguished by their odour, such as that of camphor, almond, violet, roses, &c. Cold cream, as made by English perfumers, bears a high reputation, not only at home, but throughout Europe; the quantity exported, and which can only be reckoned by jars in hundreds of dozens, and the repeated announcements that may be seen in the shops on the Continent, in Germany, France, and Italy, of 'Cold Crême Anglaise,' is good proof of the estimation in which it is held.

ROSE COLD CREAM.

Almond oil		1 lb.
Rose-water		1 „
White wax	of each	1 oz.
Spermaceti		
Otto of roses		½ drachm

Manipulation.—Into a well-glazed thick porcelain vessel,

which should be deep in preference to shallow, and capable of holding twice the quantity of cream that is to be made, place the wax and sperm. Now put the jar into a boiling bath of water; when these materials are melted, add the oil, and again subject the whole to heat until the flocks of wax and sperm are liquefied. Now remove the jar and contents, and set it under a runner containing the rose-water: the runner may be a tin can, with a small tap at the bottom, the same as used for the manufacture of milk of roses. A stirrer must be provided, made of lancewood, flat, and perforated with holes the size of a sixpence, resembling in form a large palette-knife. As soon as the rose-water is set running, the cream must be kept agitated until the whole of the water has passed into it. Now and then the flow of water must be stopped, and the cream which sets at the sides of the jar scraped down, and incorporated with that which remains fluid. In winter-time it is necessary to slightly warm the rose-water, otherwise the cream sets before it is beaten enough. When the whole of the water has been incorporated, the cream will be cool enough to pour into the jars for sale; at that time the otto of rose is to be added. The reason for the perfume being put in at the last moment is obvious—the heat and subsequent agitation would cause unnecessary loss by evaporation. Cold cream made in this way sets quite firmly in the jars into which it is poured, and retains a 'face' resembling pure wax, although one half is water retained in the interstices of the cream. When the pots are well glazed, it will keep good for one or two years. If desired for exportation to the East or West Indies, it should always be sent out in stoppered bottles.

COLD CREAM OF ALMONDS

is prepared precisely as the above; but in the place of otto of roses otto of almonds is used.

VIOLET COLD CREAM.

Huile violette		1 lb.
Violet-water		1 „
Wax and spermaceti	each	1 oz.
Otto of almonds		5 drops

This is an elegant preparation, and generally admired.

TUBEREUSE, JASMINE, AND FLEUR D'ORANGE COLD CREAMS

are prepared in a similar manner to the above violet. They are all very exquisite preparations; but, as they *cost* more than rose cold cream, perfumers are not much inclined to introduce them in lieu of the latter.

CAMPHOR COLD CREAM (otherwise CAMPHOR ICE).

Almond oil	1 lb.
Rose-water	1 „
Wax and spermaceti	1 oz.
Camphor	2 „
Otto of rosemary	1 drachm

Melt the camphor, wax, and sperm, in the oil; then manipulate as for cold cream of roses.

GLYCERINE COLD CREAM.—As rose cold cream has the disadvantage of being difficult to keep, it is better to substitute glycerine for the water. A cold cream which will keep and bear any climate is thus obtained.

CUCUMBER COLD CREAM.

Almond oil		1 lb.
Green oil		1 oz.
Juice of cucumbers		1 lb.
Wax and sperm	each	1 oz.
Essence of cucumber		2 „

If in youth we were more careful, it is certain that, as we progress onward in the journey of life, the exception would be to see a person with the skin dull at an age when it ought to have the most youthful freshness. The trouble of preservation is far more simple, agreeable, and effectual than that of restoration, to which it is necessary to have recourse in order to repair the wrongs of a careless negligence. Freckles are considered by the majority as inimical to beauty; we, however, are of the minority, and rather admire them. They are the result of intermingling of race, of the dark blood of the South with the fair Saxon. It is positive that they indicate exuberant health—and what is more beautiful than the hue of health? As the summer advances, freckles appear. If the skin is exposed to the sun, it is darkened like a cherry or a peach that is ripening. The effect of the sun upon a delicate skin is very rapid, and it becomes sun-burnt, which in many instances produces inconvenience, attended with slight pain. Of the various cosmetics invented for preventing and remedying this evil, cucumber cream bears a just reputation.

The cucumber juice is readily obtained by subjecting the fruit to pressure in the ordinary tincture press. It must be raised to a temperature high enough to coagulate the small portion of albumen which it contains, and then strained through fine linen. As the heat is detrimental to the odour, on account of the great volatility of the otto of cucumber, the following method may be adopted with advantage :—

Slice the fruit very fine with a cucumber-cutter, and place them in the oil; after remaining together for twenty-four hours, repeat the operation, using fresh fruit in the strained oil. No warmth is necessary, or, at most, not more than a summer heat. Then proceed to make the cold cream in the usual manner, using the almond oil thus odorised, the rose-water, and other ingredients in the regular way, perfuming with essence of cucumber.

Another and commoner preparation of cucumber is found

among the Parisians, which is lard simply scented with the juice from the fruit, thus :—The lard is liquefied by heat in a vessel subject to a water bath; the cucumber juice is then stirred well into it; the vessel containing the ingredients is now placed in a quiet situation to cool. The lard will rise to the surface, and when cold must be removed from the fluid juice; the same manipulation being repeated as often as required, according to the strength of odour of the fruit desired in the grease.

POMADE OF CUCUMBER.

Benzoinated lard	6 lbs.
Spermaceti	2 „
Spirit of cucumber	1 „

Melt the spermaceti with the lard; then keep it constantly in motion while it cools. Now beat the grease in a mortar, gradually adding the essence of cucumbers; continue to beat the whole until the spirit is evaporated, and the pomade is beautifully white.

Apply it by rubbing a little all over the skin at bedtime, and also by placing a piece about the size of a filbert on the sponge or towel with the soap used in washing. A small piece may also be rubbed over the skin with advantage before going into the sunshine, as when health and enjoyment are sought on the sea-shore.

Melons and other similar fruit will scent grease treated in the same way.

POMADE DIVINE.

Among the thousand and one quack nostrums, pomade divine, like James's powder, has obtained a reputation far above the most sanguine expectations of its concocters. This article strictly belongs to the druggist, being sold as a remedial agent; nevertheless, what is sold is almost always vended by the perfumer. It is prepared thus :—

Spermaceti	¼ lb.
Lard	½ „
Almond oil	¾ „
Gum benzoin	¼ „
Vanilla beans	1½ oz.

Digest the whole in a vessel heated by a water bath at a temperature not exceeding 90° C. After five or six hours it is fit to strain, and may be poured into the bottles for sale.

(Must be *stamped*, if its medicinal qualities are stated.)

ALMOND BALLS.

Purified suet	1 lb.
White wax	½ „
Otto of almonds	1 drachm
„ cloves	¼ „

CAMPHOR BALLS.

Purified suet	1 lb.
White wax	¼ „
Camphor	¼ „
Otto of French lavender or rosemary	½ oz.

Both the above articles are sold, either white or coloured with alkanet root. When thoroughly melted, the material is cast in a mould; ounce gallipots with smooth bottoms answer very well for casting in. Some vendors use only large pill-boxes.

CAMPHOR PASTE.

Almond oil	½ lb.
Purified lard	„
Wax, spermaceti, and camphor	each 1 oz.

Beat up the ingredients as they cool, before pouring out.

SECTION XIV.

POMADES AND OILS.

Through jasmine bowers and violet-scented vales
On silken pinions flew the wanton gales,
Stealing their odours from the plants they left,
Then whispered to the woods their spicy theft.

ACCORDING to ancient writers, the words unguent, pomatum, ointment are synonymous titles for medicated and perfumed greases. Among Biblical interpreters, the significant word is mostly rendered 'ointment;' thus we have in Prov. xxvii. 9, 'Ointment and perfume rejoice the heart;' in Eccles. ix. 8, 'Let thy head lack no ointment.' 'The sons of the priests made the ointments of the spices' (1 Chron. ix. 30); 'Hezekiah was glad, and showed them his treasures, his spices, and the precious ointment' (Isa. xxxix. 2).

Oiling and greasing the hair is a custom pretty nearly universal among the people of all civilised nations. There are oil-glands on the scalp;[1] but their power of secretion is very slight, except in a few rare instances; in these cases the hair is said to be naturally 'moist' and soft. The general rule is, that the hair grows harsh and 'dry' for the lack of natural oily secretion; hence the instinctive application of an artificial oil—a practice hallowed by its ancient custom, and sanctioned as 'necessary,' from the Court beauty of St. James's, to the belle of equatorial Africa. M. Du Chaillu,

[1] Gazenave, *Traité des maladies du cuir chevelu*, Paris, 1850.

speaking of the use of njavi oil by the natives of Goumbi, says :—

> They mix the njavi oil with a kind of odoriferous powder called *yombo*, and this mixture is then applied in great quantities upon their wool (*i.e.* hair). They think it gives out a pleasant fragrance, but I differ from them.

Now, oiling the hair, besides making it glossy and soft, has the infinite benefit of rendering it 'uninhabitable;' a consideration too often neglected in schools, and similar institutions.

The name of pomatum is derived from *pomum*, an apple, because it was originally made by macerating over-ripe apples in grease.

If an apple be stuck all over with spice, such as cloves, then exposed to the air for a few days, and afterwards macerated in purified melted lard, or any other fatty matter, the grease will become perfumed. Repeating the operation with the same grease several times produces real 'pomatum.'

According to a recipe published more than a century ago, the form given is :—

> Kid's grease, an orange sliced, pippins, a glase of rose-water, and half a glass of white wine, boiled and strained, and at last sprinkled with oil of sweet almonds.

The author, Dr. Quincy, observes, that 'the apple is of no significance at all in the recipe;' and, like many authors of the present day, concludes that the reader is as well acquainted with the subject as the writer, and therefore considers that the weights or bulk of the materials in his recipe are likewise of no significance.

Perfumers, acting by experience or Dr. Quincy's advice, pay no regard to the apples in the preparation of pomatum, but make it by perfuming lard or suet, or a mixture of wax, spermaceti, and oil, or some of them or all blended, to produce a particular result, according to the name that it bears.

The most important thing to consider in the manufacture

of pomatum, &c., is to start off with a *perfectly inodorous* grease, whatever that grease may be.

Inodorous lard is obtained thus: –

Take, say, 28lbs. of *perfectly fresh* lard, place it in a well-glazed vessel, that can be submitted to the heat of a boiling salt-water bath, or by steam under a slight pressure; when the lard is melted, add to it one ounce of powdered alum and two ounces of table salt; maintain the heat for some time, in fact, till a scum rises, consisting in a great measure of coagulated proteine compounds, membrane, &c., which must be skimmed off; when the liquid grease appears of a uniform nature, it is allowed to grow cold.

The lard is now to be washed. This is done in small portions at a time, and is a work of much labour, which, however, is amply repaid by the result. About a pound of the grease is now placed on a slate slab, a little on the incline, a supply of good water being set to trickle over it; the surface of the grease is then constantly renewed by an operative working a muller over it, precisely as a colour-maker grinds paints in oil. In this way the water removes any traces of alum or salt, also the last traces of nitrogenous matter. Finally, the grease, when the whole is washed in this way, is remelted, the heat being maintained enough to drive off any adhering water. When cold it is finished.

Although purifying grease in this way is troublesome, and takes a good deal of time, yet, unless done so, it is totally unfit for perfuming with flowers, because a bad grease will cost more in perfume to cover its *mal odeur* than the expense of thus deodorising it. Moreover, if lard be used that 'smells of the pig,' it is next to impossible to impart to it any delicate odour; and if strongly perfumed by the addition of ottos, the unpurified grease will not keep, but quickly become rancid. Under any circumstances, therefore, grease that is not *perfectly inodorous* is a very expensive material to use in the manufacture of pomades.

In the south and flower-growing countries, where the fine pomades are made by ENFLEURAGE, or by MACERATION, the purification of grease for the purpose of these manufactures is of sufficient importance to become a separate trade.

The purification of beef and mutton suet is in a great measure the same as that for lard: the greater solidity of

suets requires a mechanical arrangement, for washing them, of a more powerful nature than can be applied by hand labour. Mr. Ewen, of Garlick Hill, who is an extensive lard and fat-purifier in London, employs a stone roller rotating upon a circular slab; motion is given to the roller by an axle which passes through the centre of the slab, or rather stone bed, upon which the suet is placed; being higher in the centre than at the sides, the stream of water flows away after it has once passed over the suet; in other respects the treatment is the same as for lard. These greases used by perfumers have a general title of 'body,' tantamount to the French nomenclature of *corps*; thus we have pomades of hard corps (suet), pomades of soft corps (lard). When drawing ***extraits*** from the enfleuraged grease, such as extrait de violette, jasmin, the pomades of hard corps are to be preferred; but when scented pomade is to be used in fabrication of unguents for the hair, pomades of soft corps are the most useful.

The following process of purifying grease prior to enfleurage has been expressly written for this work by M. Auguste Bermond, of Nice:—

ÉPURATION DES GRAISSES.

Choisissez les graisses toujours les plus fraîches, en ôtant toutes les fibres et petites peaux qui peuvent les corrompre.

Pour cinquante kilogs. de graisse.—Vous la coupez par morceaux, ensuite vous la pilez dans un mortier en pierre ou marbre. De suite qu'elle est bien écrasée, il faut la laver, et la faire dégorger dans de l'eau fraîche. Il faut répéter le lavage au moins six fois, jusqu'à ce que toute l'eau soit claire comme quand vous la mettez. Cette opération terminée, faites fondre la graisse, en y ajoutant cent grammes d'alun de glace pulvérisée, et une poignée de sel marin; faites bouillir, et écumez quelques secondes. Après, passez la graisse fondue à travers un linge pas trop serré, sans trop presser les cretons, soit le marc, que vous réservez pour vos pommades communes. Vous laissez reposer la graisse dans un grand récipient environ deux heures; ensuite, vous retirez votre graisse au clair sans y laisser d'eau.

Vous remettez après la graisse fondue à feu nu, avec trois ou quatre litres d'eau de rose, et cent cinquante grammes de benjoin bien en poudre ; vous faites bouillir petit à petit, en retirant sans cesse l'écume que fait la graisse ; quand après une heure environ vous vous apercevez qu'il ne sort plus d'écume, vous retirez tout le feu, vous laissez reposer le mélange quatre ou cinq heures ; ensuite vous tirez au clair dans des jarres ou cuvettes en fer-blanc, et l'opération est terminée. Laissez toujours quelques livres de corps au fond, dans la crainte qu'il ne passe pas d'eau ; cette matière vous servira à d'autres emplois. Pour épurer la graisse de bœuf, vous faites la même chose.

Pour éviter que votre corps avec les chaleurs ne tourne pas au gras, vous mettrez cent kilogs. de graisse de porc, vingt-cinq kilogs. de graisse de bœuf en été, ou moitié par moitié.

Which may be briefly rendered :—

Take one hundredweight of perfectly fresh grease, either of lard or beef suet ; cut the grease into small pieces, and well pound it in a mortar ; when it is well crushed, wash it with water repeatedly, so long, in fact, until the water is as clear after withdrawing the grease as before it was put in. The grease has now to be melted over a slow fire, adding thereto about three ounces of crystallised alum in powder, and a handful of sea salt (common salt) ; now let the grease boil, but allow it to bubble for a few seconds only ; then strain the grease through fine linen, into a deep pan, and allow it to stand, to clear itself from all impurities, for about two hours. The clear grease is then again to be put into the pan, over a bright fire, adding thereto about three or four quarts of rose-water, and about five ounces of powdered gum benzoin : it is allowed to boil gently, and all scum that rises is to be removed, until it ceases to be produced ; finally the grease is put into deep pans, and when cold taken carefully off the sedimentary water ; it is then fit for use, and may be kept for an indefinite period, without changing or turning rancid.

It will be observed that the principal feature in this process is the use of the benzoin.

Dr. Redwood has recently directed the attention of chemists[1] to the fact that certain ointments, particularly zinc ointment, will not become rancid, if a little gum benzoin, or benzoic acid, is added to it when made. That such is the case, there is little doubt ; for it has been remarked that the prepared fat used by the flower farmers in the process of en-

[1] *Pharmaceutical Journal*, vol. xiv. No. 5.

fleurage will remain sweet for some years, provided that it be digested for a time over gum benzoin, in the process of its purification—a practice that has been generally worked for this century at Grasse, Cannes, and Nice. It therefore becomes only a question of experiment, to determine whether benzoin be a true antiseptic to all fatty bodies.

Fatty bodies, under the influence of nitrogenised substances (albumen, blood, &c.), are oxidised, and acidified, and undergo a kind of fermentation, which is called *rancio*. This change must be resisted as far as possible. Repeated washings in water and fusion at a mild temperature are in most cases sufficient. These fatty bodies may be perfectly preserved and their spontaneous acidification prevented by the addition of a small quantity of resin or of a balsam. Benzoin lard is prepared with benzoin, as we have just said; if balsam of Tolu is added to it, it takes the name of Tolu lard—for this purpose to be exhausted with warm water; that is to say, the residuum after preparation of the syrup of Tolu.

The method of perfuming grease by the direct process with flowers having already been described, under the respective names of the flowers that impart the odour thereto, it remains now only to describe those compounds that are made from them, together with such incidental matter connected with this branch of perfumery as has not been previously mentioned.

Although the unguents properly so called are not employed in perfumery, it is important to show the distinction which must be drawn between these preparations and pomades.

Unguents, whatever be their degree of consistence, are mixtures in variable proportions of fatty bodies, wax, oils, and resins, with a variety of substances. The essential difference between pomades and unguents is that the former never contain resins. Pomades are divisible into several classes

—those prepared by solution (camphorated pomade, and most sweet-smelling pomades employed in perfumery), and pomades by simple mixture, such as oxide of zinc pomade.

Philocome is nothing but wax and oil.

OIL OF BEN OR BEHEN.

Undoubtedly this is the finest fat oil which a perfumer could use; it is nearly free from colour, is tasteless and inodorous; it remains for a lengthened period free from rancidity; indeed, some authors say, it 'never' becomes rancid—a sample which I have placed in a position in which all other oils would be spoilt in a year is still perfectly sweet though nearly six years old. At one period the oil of ben constituted a valuable branch of commerce with the East, but excessive imposts and extensive adulterations threw it out of the market.

In the hope of restoring so valuable an article to its merited position, I am induced thus to speak of a commodity, though but little of it can at the present time be commercially obtained. The oil is yielded by expression from the seeds of the *Moringa pterygosperma* or oil of behen tree, Guertn., *Hyperanthera moringa*, Willd., now naturalised in the West Indies. The seeds are said to yield twenty-five per cent. of oil, which at a price say of five guineas a hundred-weight—the present market value of sweet almond oil—would surely offer sufficient mercantile inducement for its production; but there is every reason to believe that it would realise never less than 10*l.* per cwt. in the open market. For making cold cream and all kinds of unguents, it would prove invaluable and without a competitor. Supposing that it would 'not pay' its producers to ship it in its natural state, they could enflower it with the flowers of the plumeria, acacia, jasmin-grandiflora, and pancratium, and numerous other flowers which abound

and bloom unregarded; it would then yield six to eight shillings a pound!

The seeds of the apterous ben, *Moringa aptera*, Guertn., likewise produce a highly prized oil. They are known as the *white nuts of ben;* and the *grey nuts of ben*, which are less valued, are attributed to the *Moringa disperma.*

PARAFFIN,

that is, the true solid wax-like inodorous substance procurable by low distillation of boghead mineral, Irish bog peat, &c., &c., is an article that will find several uses in perfumery in place of bees' wax. I have said it is wax-like; but in truth on account of its crystalline character it more resembles spermaceti, and has also the semi-transparency of that body.

Young's Patent Paraffin Company have generously supplied me with some fine samples of the sperm-like paraffin, which they say can be supplied in quantity at 1*s.* 5*d.* per lb. This, being 40 per cent. cheaper than wax, will of a certainty find its own market. From a variety of experiments I conclude that paraffin is a valuable adjunct to perfumery, in the manufacture of pomades, &c., which have to be exported to hot climates.

Paraffin takes its name from the Latin *parum affinis*, intended to express its want of chemical affinity with other bodies. It was formerly extracted almost exclusively from coal-tar, and from the products of the distillation of coal; but it is now made, or rather extracted, from a schist coal by Young's process to an enormous extent.

Paraffin crystallises in beautiful pearly scales, fusible at 43°. It is volatilised without decomposition, and burns with a white flame. It is soluble in ether, and hardly soluble in alcohol. These pomades are not liable to become rancid.

ACACIA POMADE, COMMONLY CALLED CASSIE POMATUM,

is made with a purified body-grease, by maceration with the little round yellow flower-heads of the *Acacia Farnesiana*.[1]

Black-currant leaves, which the French term *cassis*, have an odour very much resembling cassie (acacia), and are used extensively for adulterating the true acacia pomades and oils. The near similarity of name, their analogous odour (although the plants have no botanical connection), together with the word *cassia*, a familiar perfume in England, have produced generally confused ideas in this country as to the true origin of the odour now under discussion. Cassie, cassis, cassia, it will be understood now, are three distinct substances; and in order to render the matter more perspicuous in future, the materials will always be denominated ACACIA, if prepared from the *Acacia Farnesiana*; CASSE, when from *black-currant*; and CASSIA, if derived from the bark of the *Cinnamomum Cassia*.

BENZOIN POMADE AND OIL.

Benzoic acid is perfectly soluble in hot grease. Half an ounce of benzoic acid, being dissolved in half a pint of hot olive or almond oil, deposits, on cooling, beautiful acicular crystals, similar to the crystals that effloresce from Vanilla beans; a portion of the acid, however, remains dissolved in the oil at the ordinary temperature, and imparts to it the peculiar aroma of benzoin. Upon this idea is based the principle of perfuming grease with gum benzoin by the direct process—that is, by macerating powdered gum benzoin in melted suet or lard for a few hours at a temperature of about 80° C. to 90° C. Nearly all the gum resins give up

[1] I have placed a few of these plants in the Botanic Gardens, Regent's Park, and some seeds have been planted at Kew.

their odoriferous principle to fatty bodies when treated in the same way; this fact becoming generally known, will probably give rise to the preparation of some new remedial ointments, such as *Unguentum myrrhæ*, *Unguentum assafœtida*, and the like.

Myrrh, assafœtida, and many other resins and gum-resins, were formerly ingredients in various preparations.

TONQUIN POMADE AND TONQUIN OIL

are prepared by macerating the ground Tonquin beans in either melted fat or warm oil, from twelve to twenty-eight hours, in the proportion of

Tonquin beans	½ lb.
Fat or oil	4 „

Strain through fine muslin; when cold, the grease will have a fine odour of the beans.

Messrs. Max Brothers, of Paris, prepare the true COUMARINE principle from Tonquin beans, which may be advantageously used for scenting oil, fat, and spirit. This firm also prepare Vanilline from Vanilla, and an article they term Heliotropine, extracted from the common Vanillon: all are in white crystals.

VANILLA OIL AND POMADE.

Vanilla pods	¼ lb.
Fat or oil	4 „

Macerate at a temperature of 25° C., for three or four days; finally strain.

These pomatums and oils, together with the French pomades and huiles already described, constitute the *foundation* of the preparations of all the best hair greases sold by per-

fumers. Inferior scented pomatums and oils are prepared by perfuming lard, suet, wax, oil, &c., with various ottos. The results however, in many instances more expensive than the foregoing, are actually inferior in their odour or bouquet; for grease, however slightly perfumed by maceration or enfleurage with flowers, is far more agreeable to the olfactory nerve than when scented by ottos.

The following named greases have obtained great popularity, mainly because their perfume is lasting and flowery.

POMADE CALLED BEARS' GREASE.

The most popular and 'original' bears' grease is made thus:—

Huile de rose „ fleur d'orange „ acacia „ tubereuse and jasmin	of each	½ lb.
Almond oil		10 lbs.
Lard		12 „
Acacia pomade		2 „
Otto of bergamot		4 oz.
„ cloves		2 „

Melt the solid greases and oils together by a water bath, then add the ottos.

Bears' grease thus prepared is just hard enough to 'set' in the pots at a summer heat. In very warm weather, or if required for exportation to the East or West Indies, it is necessary to use in part French pomatums instead of oils, or more lard and less almond oil.

ALPACA POMATUM.

The fat of the alpaca, together with other useful products from this animal, was first sent as an exhibit from Australia to

the London Exhibition of 1862. Bears' grease has had its day—poor Bruin is dead, Alpaca now reigns in his place; but even alpaca was mortal; enough grease could not be got 'genuine' from the Silky Goat. However, the washed pomatum which at all times is a large by-product in the laboratory of a wholesale manufacturing perfumer offers itself as a superior substitute for the original. 'Heads of Families' are now supplied with alpaca pomatum, made thus:—

Washed pomatum	21 lbs.
Olive oil	7 „
Otto of nutmeg	2 oz.

As with other mixed grease, the proportion of oil must vary for climate and season.

CIRCASSIAN CREAM.

Purified lard	1 lb.
Benzoin suet	1 „
French rose pomatum	½ „
Almond oil, coloured with alkanet	2 „
Otto of rose	¼ oz.

BALSAM OF FLOWERS.

French rose pomatum	12 oz.
„ violet pomatum	12 „
Almond oil	2 lbs.
Otto of bergamot	¼ oz.

CRYSTALLISED LEMON ICE.

This is a very favourite unguent or pomade among the people of the West Indian Islands and is made thus:—

Almond oil	2½ lbs.
Spermaceti or paraffin wax	8 oz.
Otto of Montserrat lime, „ Portugal zeste, of each	3 „

CRYSTALLISED OIL.

First quality.

Huile de rose	1 lb.
„ tubereuse	1 „
„ fleur d'orange	½ „
Spermaceti	½ „

Second quality.

Almond	2½ lbs.
Spermaceti	½ „
Otto of lemon	3 oz.

Melt the spermaceti in a vessel heated by a water bath, then add the oils; continue the heat until all flocks disappear; let the jars into which it is poured be warm; cool as slowly as possible, to ensure good crystals. If cooled rapidly, the mass congeals without the appearance of crystals.

This preparation has a very nice appearance, and so far sells well; but its continued use for anointing the hair renders the head scurfy; indeed the crystals of sperm may be combed out of the hair in flakes after it has been used a week or two.

CASTOR OIL POMATUM.

Tubereuse pomatum	1 lb.
Castor oil	½ „
Almond oil	½ „
Otto of bergamot	1 oz.

BALSAM OF NEROLI.

French rose pomatum	½ lb.
„ jasmine pomatum	½ „
Almond oil	¾ „
Otto of neroli	1 drachm

MARROW CREAM.

Purified lard	1 lb.
Almond oil	1 „
Palm oil	1 oz.
Otto of cloves	½ drachm
„ bergamot	½ oz.
„ lemon	1½ „

MARROW POMATUM.

Purified lard	4 lbs.
„ suet	2 „
Otto of lemon	1 oz.
„ bergamot	½ „
„ cloves	3 drachms

Melt the greases; then beat them up with a whisk, or flat wooden spatula, for half an hour or more; as the grease cools, minute vesicles of air are enclosed by the pomatum, which not only increase the bulk of the mixtures, but impart a peculiar mechanical aggregation, rendering the pomatum light and spongy. In this state it is obvious that it fills out more pots than otherwise, and hence is more profitable.

COMMON VIOLET POMATUM.

Purified lard	1 lb.
Washed acacia pomatum	6 oz.
„ rose pomatum	4 „

Manipulate as for marrow pomatum.

In all the cheap preparations for the hair, the manufacturing perfumers use the *washed* French pomatums and the washed French oils for making their greases. Washed pomatums and washed oils are those greases that originally have been the best pomatums and huiles prepared by enfleurage and by maceration with the flowers; which pomades and huiles have been subjected to digestion in alcohol for the

manufacture of essences for the handkerchief. After the spirit has been on the pomatums, &c., it is poured off; the residue is then called *washed* pomatum, and still retains an odour strong enough for the manufacture of most hair greases.

For pomatums of other odours it is only necessary to substitute rose, jasmine, tubereuse, and others, in place of the acacia pomatum in the above formulæ.

POMADES DOUBLES, MILLEFLEURS.

Rose, jasmine, fleur d'orange, violet, tubereuse, &c., are all made, in winter with two-thirds best French pomatum, one-third best French oils; in summer, equal parts.

POMMADE À LA HELIOTROPE.

French rose pomade	1 lb.
Vanilla oil	½ „
Huile de jasmin	4 oz.
„ tubereuse	2 „
„ fleur d'orange	2 „
Otto of almonds	6 drops
„ cloves	3 „

HUILE ANTIQUE À LA HELIOTROPE.

Same as the above, substituting rose oil for the pomade.

PHILOCOME.

The name of this preparation, which is a compound of two Greek words (φίλος and κόμη), signifying 'a friend to the hair,' was first introduced by the Parisian perfumers; and a very good name it is, for philocome is undoubtedly one of the best unguents for the hair that is made.

PHILOCOME.

First quality.

White wax	10 oz.
French rose oil	1 lb.
„ acacia oil	½ „
„ jasmine oil	½ „
„ fleur d'orange oil	1 „
„ tubereuse oil	1 „

Melt the wax in the oils by a water bath at the lowest possible temperature. Stir the mixture as it cools; do not pour out the philocome until it is nearly cool enough to set; let the jars, bottles, or pots, into which it is filled for sale, be slightly warmed, or at least of the same temperature as the philocome, otherwise the bottles chill the material as it is poured in, and make it appear of an uneven texture.

Second quality.

White wax	5 oz.
Almond oil	2 lbs.
Otto of bergamot	1 oz.
„ lemon	½ „
„ lavender	2 drachms
„ cloves	1 „

LUSTRAL FLUID.

Take 1 oz. of wax to 1 lb. of oil, and scent as above.

POMMADE HONGROISE.

For the Moustache.

White wax	1 lb.
Oil soap	½ „
Gum arabic	½ „
Rose-water	1 pint
Otto of bergamot	1 oz.
„ thyme	½ drachm

Melt the gum and the soap in the water by a gentle heat, then add the wax, constantly stirring the ingredients together; when of a uniform consistency, put in the perfume.

If required to be tinted, use burnt umber ground in oil (sold in tubes by the artists' colourmen), for shades of brown; or for black, stain with ivory black in oil, the same as for the brown shade.

WHITE HARD OR STICK POMATUMS.

Benzoinated suet	1 lb.
White wax or paraffin	1 „
Jasmine pomatum	½ „
Tubereuse pomatum	½ „
Otto of rose	1 drachm

WHITE BATONS OR COSMETICS.

Suet	1 lb.
Wax or paraffin	½ „
Otto of bergamot	1 oz.
„ cassia	1 drachm
„ thyme	½ „

BROWN AND BLACK BATONS

are also in demand. They are made in the same way as the above, but coloured with lamp-black or umber ground in almond oil. Such colours are best purchased ready ground at an artists' colourman's.

BLACK AND BROWN COSMETIQUE,

such as is sold under the name of Water Cosmetic, is prepared with a nicely scented soap, strongly coloured with lamp-black or with umber. The soap is melted, and the colour added while the soap is soft; when cold, it is cut up into oblong pieces.

It is used as a temporary dye for the moustache, applied with a small brush and water.

SECTION XV.

HAIR-DYES AND DEPILATORY.

BY way of personal adornment, few practices are of more ancient origin than that of painting the face, dyeing the hair, and blackening the eyebrows and eyelashes.

It is a practice universal among the women of the higher and middle classes in Egypt, and very common among those of the lower orders, to blacken the edge of the eyelids, both above and below the eye, with a black powder, which they term *kohol.* The kohol is applied with a small probe of wood, ivory, or silver, tapering towards the end, but blunt. This is moistened sometimes with rose-water, then dipped in the powder, and drawn along the edges of the eyelids. It is thought to give a very soft expression to the eye, the size of which, in appearance, it enlarges; to which circumstance, probably, Jeremiah refers when he writes, 'Though thou rentest thy face (or thine eyes) with painting, in vain shalt thou make thyself fair.'[1] Ezekiel (ch. xxiii, 40) reproveth Aholah,—'for whom thou didst wash thyself, paintedst thy eyes, and deckedst thyself.'

A singular custom is observable both among Moorish and Arab females—that of ornamenting the face between the eyes with clusters of bluish spots or other small devices, which, being stained, become permanent. The chin is also spotted in a similar manner, and a narrow blue line extends from the

[1] Jer. iv. 40. See also Lane's *Modern Egyptians*, vol. i. p. 41, et seq.

point of it, and is continued down the throat. The eyelashes, eyebrows, and also the tips and extremities of the eyelids, are coloured black. The soles, and sometimes other parts of the feet, as high as the ankles, the palms of the hands, and the nails, are dyed with a yellowish red with the leaves of a plant called henna[1], or alkanna of Cyprus and Egypt (*Lawsonia inermis*), the leaf of which somewhat resembles the myrtle, and is dried for the purposes above mentioned. The ground leaves of the henna are made into a paste with lime-water, then applied to the skin, hair, or nails, and left on several hours; the colour thus imparted will last several weeks. The back of the hand is also often coloured and ornamented in this way with different devices. On holidays they paint their cheeks of a red brick colour, a narrow red line being also drawn down the temples.

The Persians, young and old alike, dye their hair and beard every week. We have had an opportunity of examining two powders which they use for this purpose. These had been sent by Ferukh Khan to Professor Trousseau. One of them, consisting of henna, stains the hair a golden yellow colour; the other stains it blue. This is certainly an indigo-bearing plant the name of which is unknown to us. They first apply the henna, in the form of a paste made with water; with this they cover the head, and after half-an-hour they apply the blue powder in the same manner, and obtain thus a fine colour of crow's-wing black.

Similar customs are still prevalent in Persia. Lady Sheil, speaking of the Shah's mother, says :—

> The palms of her hands and tips of her fingers were dyed red with a herb called henna, and the edges of the inner part of the eyelids were coloured with antimony. All the Kajars have naturally large arched eyebrows; but, not satisfied with this, the women enlarge them by

[1] This plant is referred to in the Song of Solomon, under the name of 'Camphire,' but as Henna it is sold by Piesse and Lubin, of Bond Street.

doubling their real size with great streaks of antimony : her cheeks were well rouged, as is the invariable custom among Persian women of all classes.[1]

In Greece, for 'colouring the lashes and sockets of the eye, they throw incense or gum labdanum on some coals of fire ; the smoke which ascends is intercepted with a plate, in order to collect the soot. This I saw applied. A girl sitting, cross-legged as usual, on a sofa, closing one of her eyes, took the two lashes between the fore-finger and thumb of her left hand, pulled them forward, and then thrusting in, at the external corner, a sort of bodkin or probe, which had been immersed in the soot, and withdrawing it, the particles previously adhering to the probe remained within the eye-lashes.'[2]

Dr. Shaw states that, among other curiosities that were taken out of the tombs at Sahara relating to Egyptian women, he saw a joint of the common reed, which contained one of these bodkins, and an ounce or more of this powder.

In England, a similar practice is adopted by many persons whose hair is grey ; but instead of using the black material in the form of a powder, it is employed as a crayon, the colour being mixed with a greasy body, such as the brown and black stick pomatums described in the previous article.

The question has been frequently discussed, 'Is hair subject to sudden changes in colour?' and was answered in the negative by Dr. Davy, in a paper read before the British Association at Manchester, 1861.

The popular notion is decidedly in favour of the affirmative, and many naturalists and physiologists have come to the same conclusion. They adduce instances of the change of the hair to white or grey, in the case of persons under strong emotions of grief or terror. Haller, in his *Elementa Physiologiæ*, refers to eight authorities for examples of such changes; but all that he seems to admit for himself is that under the influence of impaired health such a change may take place slowly. Marie Antoinette was cited by favourers of the popular notion, as a striking and well authenticated instance; but when fairly

[1] *Glimpses of Life in Persia.* [2] Chandler's *Travels in Greece.*

considered, the case came under the condition admitted by Haller.

During the confinement of Marie Antoinette, the Queen of France, by the Jacobins of Paris, she was deprived of the use of the cosmetics with which she was wont to give the raven hue to her naturally silver locks; and history, in describing her execution, represents her hair as changing from a jet black to grey colour through the mental anguish she experienced.

Had it been possible for mental emotion, whether of terror or of grief, to render her hair suddenly grey, surely in the Queen's case the change should have been witnessed at an earlier period than that of the arrest of the Royal Family in their attempt to leave France. If such a sudden change could be presumed, might we not expect to witness it in soldiers engaged in an active campaign amidst all the dangers and horrors of war? Dr. Davy had himself examined thousands of soldiers, men prematurely worn out in various climates, and concerned in many a hard-fought battle—many of them grievously wounded—but he never met with an instance of the kind.

The transactions of the Royal Society, extending over 200 years, do not contain an instance of such change in the colour of the hair—a circumstance opposed to the conclusion that it ever took place, for had it ever been undoubtedly witnessed, it is not likely that it would have remained undescribed. The author is not aware that, irrespective of recorded evidence, anything in support of the popular notion can be adduced on physiological grounds. Human hair cannot be injected. Using colouring fluids, such as a solution of nitrate of silver and a solution of iodine, the author has not observed any change of colour, except in the portions actually immersed. Whether it owes its colour to a fixed oil, to a peculiar arrangement of its constitutional molecules, or to both, it resists decay in a remarkable manner; it resists the action of acids and alkalies, except the

strongest, which dissolve it. It resists maceration and even boiling water, except continued for a long time, and under pressure, when it suffers disintegration and decomposition. Exposure to the sun will bleach hair, but this will not account for any very sudden change of colour. Supporters of the popular opinion refer to changes in the plumage of birds, such as the ptarmigan, and in the hair of certain quadrupeds, such as the mountain hare and ermine, which become white towards winter, and of a darker hue when the winter is past.

Mr. Erasmus Wilson, who advocates the popular doctrine, refers to the case of a lemming in support of his views; but Mr. Blyth, a naturalist, says that he examined a lemming killed during its autumnal change, and satisfied himself that 'the white hairs were all new and not the brown changed in colour.' There are reasons why it might be expected that the summer coat and plumage should be darker than those of winter. The author concludes that whether we consider one side of the question or the other—the human evidence so questionable, the physiological so much more reliable—the idea of fallacy is unavoidable, as to the hair being subject to sudden change of colour from mental impression.

The attempts made to explain such a change by physiologists are allowed to be complete failures; and more amusing attempts had been made to explain the phenomenon on other grounds than those of fallacy. Dr. Davy, when on foreign service, knew an assistant surgeon of a regiment who had become insane, and whom he visited a fortnight or three weeks subsequently. The patient's hair, before brown, had become grey; but when he called attention to the fact, the regimental surgeon simply said, 'Your surprise will cease, when you know that——has, since he has been afflicted with his malady, discontinued dyeing his hair.'

The assassin Orsini, who was executed in Paris for attempting the life of Napoleon III. and ruthlessly murdering

twelve innocent persons, presented the same apparently strange anomaly from the same cause. When Orsini was arrested, his luxuriant locks were as black as night, but when guillotined, they were of an iron grey colour, simply because he either neglected his toilet, or else was deprived of the usual hair-dye he previously employed to give them their black colour. His friends, and the papers generally, attribute the change to another cause, of course, and we have no doubt that history will represent the effect as being produced by the mental activity and agony he experienced during his incarceration.

As a rule, all hair-dyes should be avoided; in almost every case the process is prejudicial to the unities which tend to form that harmonious whole, which we call personal beauty. The chief characteristics of beauty, independent of form, are the complexion, the eyes and the hair: and therefore the first question to be asked, before attempting to change the colour of so important an auxiliary to beauty as the hair, should naturally be—'Will the change suit the complexion and the eyes?' The Teutonic beauty of Anglo-Saxons and Anglo-Normans has come down to the people of Great Britain along with the practical common sense of the one, and the lofty bearing of the other. The mass of female loveliness which graces the land is therefore essentially 'fair'—white and clear, in contradistinction to brown and dark. A clear rosy complexion, blue eyes, and hair more or less auburn, are all the most prevalent. Now, to change either the colour of the complexion or of the hair is to destroy the unities of such a style of beauty, because the eye cannot be changed *en suite*; and it produces the same incongruous effect as an ill-dressed woman often presents by a display of ill-assorted colours in her attire. 'Fair' persons are seldom, if ever, improved in appearance by the process of hair-dyeing. Such persons who do not exhibit these marked features of Teutonic extraction, in whose veins commingles the blood of a more

southern race—whose dark or brown complexion, gazelle-like eyes, and raven hair, tend to form that style of beauty we designate 'brunette'—should age trip up youth, or their locks become prematurely grey or silver white, may call in the aid of art to restore the hair to its original tint without infringing the principles of the harmony of colour. If the hair be too glowing, too bright an auburn to assimilate well with the eyes, or with the blush of the cheek, then its redness can be artificially lowered by the application of an article sold under the name of walnut-water, but which in reality consists of a solution of plumbate of potash, and is made by dissolving freshly precipitated oxide of lead in liquor potassa to saturation.

KOHOL.

The word *Kohol* is derived from the Hebrew, and signifies *to paint.* The oriental females were, and are still, in the habit of painting the eyebrows with various pigments; the one generally employed is sulphide of antimony finely levigated. This custom has at length to a small extent been adopted in England, but the kohol employed here does not contain antimony, but consists of a solution of Chinese (Indian) ink in rose-water. To prepare the kohol, a stick of the Chinese ink, of about half an ounce weight, is to be reduced to a fine powder in a mortar—a task of no little difficulty; half a pint of hot rose-water is then to be rubbed gradually into the powder till the whole is uniformly fluid, which it will not be unless it is repeatedly triturated for two days. Kohol thus made is applied to the eye-lashes and brows with a fine camel's hair pencil.

TURKISH HAIR-DYE.

In Constantinople there are some persons, particularly Armenians, who devote themselves to the preparation of

cosmetics, and obtain large sums of money from those desirous of learning this art. Amongst these cosmetics is a black dye for the hair, which, according to M. Landerer of Athens, is prepared in the following manner:—

Finely pulverised galls are kneaded with a little oil to a paste, which is roasted in an iron pan until the oil vapours cease to evolve, upon which the residue is triturated with water into a paste, and heated again to dryness. At the same time a metallic mixture, which is brought from Egypt to the commercial marts of the East, and which is termed in Turkish *Rastikopetra*, or *Rastik-Yuzi*, is employed for this purpose. This metal, which looks like dross, is by some Armenians intentionally fused, and consists of iron and copper. It obtains its name from its use in dyeing or staining the hair, and particularly the eyebrows—for *rastik* means eyebrows, and *yuzi* stone. The fine powder of this metal is as intimately mixed as possible with the moistened gall mass into a paste, which is preserved in a damp place, by which it acquires the blackening property. In some cases this mass is mixed with the powder of odorous substances which are used in the seraglio as perfumes, and called *karsi*—that is, pleasant odour; and of these the principal ingredient is ambergris. To blacken the hair, a little of this dye is triturated in the hand or between the fingers, with which the hair or beard is well rubbed. After a few days the hair becomes very beautifully black, and it is a real pleasure to see such fine black beards as are met with in the East among the Turks who use this black dye. Another and important advantage in the use of this dye consists herein, that the hair remains soft, pliant, and for a long time black, when it has been once dyed with this substance. That the colouring properties of this dye are to be chiefly ascribed to the pyrogallic acid, which can be found by treating the mass with water, may be with certainty assumed.

LITHARGE HAIR-DYE.

Powdered litharge	2 lbs.
Quicklime	½ lb.
Calcined magnesia	½ „

Slake the lime, using as little water as possible, to make it disintegrate, then mix the whole by a sieve.

Another way.

Slaked lime	3 lbs.
White lime, in powder	2 „
Litharge	1 lb.

Mix by sifting, bottle, and well cork.

Directions to be sold with the above :—

Mix the powder with enough water to form a thick creamy fluid ; with the aid of a small brush, completely cover the hair to be dyed with this mixture ; to die a light brown, allow it to remain on the hair four hours ; dark brown, eight hours ; black, twelve hours. As the dye does not act unless it is moist, it is necessary to keep it so by wearing an oiled silk, india-rubber, or other waterproof cap.

After the hair is dyed, the refuse must be thoroughly washed from the head with plain water ; when dry, the hair must be oiled.

SIMPLE SILVER DYE.

Nitrate of silver	1 oz.
Rose-water	1 pint

Before using this dye, it is necessary to free the hair from grease by washing it with soda or pearl-ash and water. The hair must be quite dry prior to applying the dye, which is best laid on with an old tooth-brush. This dye does not 'strike' for several hours. It need scarcely be observed that its effects are more rapidly produced by exposing the hair to sunshine and air, and by washing the hair previously with sulphur soap.

HAIR-DYE, WITH MORDANT.

Brown.

Nitrate of silver		1 oz.	blue bottles
Rose-water		8 „	„
The Mordant.—Sulphuret of potassium	. .	1 oz.	white bottles
Water		6 „	„

Black.

Nitrate of silver		1 oz.	blue bottles
Water		6 „	„
The Mordant.—Sulphuret of potassium	. .	1 oz.	white bottles
Water		6 „	„

The mordant is to be applied to the hair first: when this is dry, then the silver solution.

Great care must be taken that the sulphuret is fresh made, or, at least, well preserved in closed bottles, otherwise, instead of the mordant making the hair black, it will impart a yellow hue. When the mordant is good it has a very disagreeable odour; and although this is the quickest and best dye, its unpleasant smell has given rise to the

INODOROUS DYE.

Blue Bottles.—Dissolve the nitrate of silver in the water as in the above; then add liquid ammonia by degrees until the mixture becomes cloudy from the precipitate of the oxide of silver; continue to add ammonia in small portions until the fluid again becomes bright from the oxide of silver being re-dissolved.

White Bottles.—Pour half a pint of boiling rose-water upon three ounces of powdered gall nuts; when cold, strain and bottle. This forms the mordant, and is used in the same way as the first-named dye, like the sulphuret mordant. It is not so good a dye as the previous one.

MANGANESE BROWN HAIR-DYE.

Under the name of 'Baffine,' a very excellent brown hair-dye has been introduced by Mr. Condy, of Battersea. It

consists of saturated solution of permanganate of potass. This salt, like nitrate of silver, undergoes decomposition when in contact with organic substances. Hair and skin are stained by it of a good chestnut hue. For the purpose of dyeing the hair it is therefore necessary to take the usual precaution not to wet the partings of the hair with the manganese fluid.

FRENCH BROWN DYE.

Blue Bottles.—Saturated solution of sulphate of copper; to this add ammonia enough to precipitate the oxide of copper and redissolve it (as with the silver in the above), producing the azure liquid.

White Bottles.—Mordant.—Saturated solution of prussiate of potass.

Artificial hair, for the manufacture of perukes, is dyed in the same manner as wool.

There are in the market several other hair-dyes, but all of them are but modifications of the above, possessing no marked advantage.

PENCIL WATER, AND WALNUT WATER.

Under the above names a weak hair-dye is made which consists of an alkaline solution of lead, or rather plumbate of potash: it is slow in its action, but it does not blacken the skin—no inconsiderable advantage. It may be thus prepared:—

Dissolve in one ounce of liquor potassæ as much freshly precipitated oxide of lead as it will take up, and dilute the resulting clear solution with three ounces of distilled water. Care must be taken not to wet the skin unnecessarily with it.

Almost all the liquids employed in France for dyeing the hair have for their basis the salts of silver, copper, or lead. The mordants used for fixing the colour, or rather for producing it, are sometimes solutions of potassium or sodium sulphides, and sometimes solutions of tannin, gallic acid, or

pyrogallic acid. But some traders go farther still. As the salts of silver blacken the skin, they sell, to remove the spots, a saturated solution of Potassium Cyanide.

DEPILATORY.

The subject of depilation or removal of the hair is frequently treated by ancient authors.

QUICK DEPILATORY OR RUSMA (for removing Hair).

The word depilatory is derived from the Latin *pilus*, the hair. As the ladies of this country consider the growth of hair upon the upper lip, upon the arms, and on the back of the neck to be detrimental to beauty, those who are troubled with such physical indications of good health and vital stamina have long had recourse to rusma or depilatory for removing it.

This or analogous preparations were introduced into this country from the East, rusma having been in use in the harems of Asia for many ages.

Best lime slacked	3 lbs.
Orpiment, in powder	½ lb.

Mix the material by means of a drum sieve; preserve the same for sale in well corked or stoppered bottles.

Directions to be sold with the above:—

Mix the depilatory powder with enough water to render it of a creamy consistence; lay it upon the hair for about five minutes, or until its caustic action upon the skin renders it necessary to be removed; a similar process to shaving is then to be gone through, but instead of using a razor, operate with an ivory or bone paper-knife; then wash the part with plenty of water, and apply a little cold cream.

Dr. Redwood says that the best and safest depilatory consists of a strong solution of barium sulphide made into a

paste with thick starch: it must be applied immediately it is made, as it rapidly spoils.

The precise time to leave depilatory upon the part to be depilated cannot be given, because there is a physical difference in the nature of hair. 'Raven tresses' require more time than 'flaxen locks;' the sensitiveness of the skin has also to be considered. A small feather is a very good test for its action.

A few readers will, perhaps, be disappointed in finding that I have only given one formula for depilatory. The receipts might easily have been increased in number, but not in quality. The use of arsenical compounds is objectionable, but it undoubtedly increases the depilating action of the compounds. A few compilers of 'Receipt Books,' and others, add to the lime 'charcoal powder,' 'carbonate of potass,' 'starch,' &c.; but what action have these materials, chemically, upon hair? The simplest depilatory is moistened quicklime, but it is less energetic than the mixture recommended above; it answers very well for tanners and fellmongers, with whom time is no object.

BOUDET'S DEPILATORY.

Powdered quicklime	10 grammes
Sulphydrate of soda	3 „
Starch	10 „

This powder is first diluted in a little water and then applied. It acts in a few minutes (20 to 30).

BŒTTGER'S DEPILATORY.

Pass a current of hydrosulphuric acid into very thick whitewash till it is saturated. Take of this sulphydrate of lime well drained, 20 grammes; glycerole of starch and starch, each 10 grammes; essence of citron or other essence, 10 drops. Apply the paste, and wash after 20 to 30 minutes.

HERNANDIA DEPILATORY.

Burnett says that the juice of the leaves of the *Hernandia Sonora* is found to be an advantageous and effectual depilatory, as it destroys the hair wherever it is employed, without pain to the skin.

Knowing from experience how much many of my countrywomen would value such an article, it is my intention at an early period to test the value of this assertion, and if it be possessed of the properties asserted, Hernandia depilatory shall shortly be at their command.

The *Hernandia Sonora*, family of the lauraceæ, grows in the Antilles. It takes its name from the noise the wind makes in passing over its stiff calices, with their tough and close sections.

GOLDEN HAIR POWDER.

Poudre d'or was first worn by the Empress Eugénie, at the Festival of Bœuf Gras, 1860. Since then this pretty conceit, as the wave of fashion always does, has extended from its centre to the circle of all who pretend to move within its sphere.

The best quality consists of crushed gold leaf, the common kind, or 'speckles,' is nothing more than a coarse bronze powder.

SNOW POWDER—DIAMOND DUST.

This consists of very thin glass powdered, sometimes called Frost; it is a necessary requisite for ladies going to a fancy ball, dressed as Snow or Frost.

SECTION XVI.

ABSORBENT POWDERS AND ROUGES.

A LADY'S toilet-table is incomplete without a box of some absorbent powder; indeed, from our earliest infancy, powder is used for drying the skin with the greatest benefit: no wonder that its use is continued in advanced years, if, by slight modifications in its composition, it can be employed not only as an absorbent, but as a means of 'personal adornment.' We are quite within limits in stating that many tons weight of such powders are used in this country annually. They are principally composed of various starches, prepared from wheat, potatoes, and various nuts, mixed more or less with powdered talc, magnesia, steatite (soap-stone), French chalk, oxide of bismuth, and oxide of zinc, &c. These powders are best applied to the face with a hare's foot, which is prepared and fitted with handles for that purpose. When, however, the powder is applied to the skin generally, as for the purpose of drying it after washing, what is termed a 'puff,' of swan's down, is now mostly employed. An authority has informed me that there are about 5,000 swans' skins imported into England annually—passing through the Custom-house; however, there is good reason to suppose that vast numbers also find their way here, 'dispensing with the tediousness of customs regulations altogether;' now presuming this number to be 2,000, we should have an actual importation of 7,000 swans' skins. Each skin will make on an average 60 puffs,

equal to a total produce of 420,000 per annum. The name puff applied to these articles is derived from the 'puff box,' a 'household appendage' of every home in the reign of the Georges, at which time everybody wore powder. The puff box of that period was constructed like a flower dredger; but the sides of it were collapsible leather; in the interior was a spring and the powder. It was used like a pair of bellows. Thus our grandfathers powder-puffed themselves before they entered society! The best swans' skins for puffs come from Holland, and are very thick in the down. There are some imported from Canada, and North America, but, like our English swans, they are thinner in the down than the Dutch swan. The most popular powder is what is termed

VIOLET POWDER.

Wheat starch	12 lbs.
Orris-root powder	2 „
Otto of lemon	½ oz.
„ bergamot	¼ „
„ cloves	2 drachms

PISTACHIO-NUT TOILET-POWDER.

Starch of pistachio nuts	7 lbs.
French chalk, in fine powder	7 „
Otto of rose and lavender	each 1 drachm

Well sifted together through a fine sieve.

Starch can be procured from an infinite variety of sources; and according to the material it is procured from, so is the size of the grain. Wheat starch comparatively has a very coarse grain: hence the ordinary powder is too coarse for the complexion, but nut starch (Brazil, Barcelona, almond, pistachio, or any other) yields a fine grain, smooth and soft, very suitable for complexion powders.

ROSE FACE POWDER.

Rice starch	7 lbs.
Rose pink	½ drachm
Otto of rose	2 drachms
„ santal	2 „

PLAIN OR UNSCENTED HAIR POWDER

Is pure wheat starch.

FACE POWDER.

Starch	1 lb.
Oxide of bismuth	4 oz.

PERLE POWDER.

French chalk	1 lb.
Oxide of bismuth	1 oz.
Oxide of zinc	1 „

FRENCH BLANC

is levigated talc passed through a silk sieve.

This is a very good face powder, particularly as it does not discolour from emanation of the skin or impure atmosphere.

As to painting the face, it appears to be practised, more or less, by both male and female, from the earliest period to the present time. 'And when Jehu was come to Jezreel, Jezebel heard of it; and she painted her face, and tired her head, and looked out at a window' (2 Kings ix. 30). Gibbon,[1] describing the Roman Emperor Elagabalus, says, that at his first entry into the eternal city, his eyebrows were tinged with black, and his cheeks painted with an artificial red and

[1] Gibbon's *Decline and Fall of the Roman Empire*, vol. i., ch. vi. p. 233.

white. Almost the first present that the Empress made to Catherine, newly arrived at court, and scarcely fifteen years old, was a rouge-pot.[1] The late Duke of Brunswick whom it will be remembered willed a large sum of money and treasure to the Town Council of Geneva, never appeared in public until 'got up' with a fair quantity of rouge, and which was more particularly noticed, as his Grace invariably painted round his eyes so much that he appeared just to have escaped after a pugilistic encounter. His Grace was rather eccentric, to be sure, as it has been said that he went to France in a balloon, for fear of the *mal de mer*.

LIQUID BLANC DE PERLE (for theatrical use).

The use of a white paint by actresses and dancers is absolutely necessary; great exertion produces a florid complexion, which is incompatible with certain scenic effects, and requires a cosmetic to subdue it. The late Madame Vestris, during her stage career, had probably consumed more than half a hundredweight of oxide of bismuth, prepared thus :—

Rose or orange-flower water	1 pint
Oxide of bismuth	4 oz.

Mixed by long trituration.

CALCINED TALC

is also extensively used as a toilet powder, and is sold under various names; it is not so unctuous as the ordinary kind.

ROUGE AND RED PAINTS.

These preparations are in demand, not only for theatrical use, but by private individuals. Various shades of colour are

[1] *Mémoires de l'Impératrice Catherine II.* par M. A. Herzen.

made to suit the complexions of the blonde and brunette. One of the best kinds is what is termed

Bloom of Roses.

Strong liquid ammonia	½ oz.
Finest carmine	¼ „
Rose-water	1 pint
Esprit de rose, triple	½ oz.

This preparation, almost a necessary appendage to the toilet of every lady in France and Germany, is used to impart to the lips that cherry-like hue so much admired. It is also used to give the pale and wan cheek a roseate bloom. In many respects it is superior to rouge, which is now almost as prevalent in this country as in the days of George the Third, when spots and rouge were fit subjects for Swift's sarcasm.

Place the carmine in a pint bottle, and pour on it the ammonia; allow them to remain together, with occasional agitation, for two days; then add the rose-water and esprit, and well mix. Place the bottle in a quiet situation for a week; any precipitate of impurities from the carmine will subside; the supernatant 'Bloom of Roses' is then to be bottled for sale. If the carmine was perfectly pure, there would be no precipitate; nearly all the carmine purchased from the makers is more or less sophisticated, its enormous price being a premium for its adulteration.

Carmine cannot be manufactured *profitably* on a small scale for commercial purposes; four or five manufacturers supply the whole of Europe. M. Titard, Rue Grenier St. Lazare, Paris, produces, without doubt, the finest article; singularly enough, however, the principal operative in the establishment is an old Englishman.

The preparation of the finest carmine is still a mystery, because, on the one hand, its consumption being very limited, few persons are engaged in its manufacture, and, upon the other, the raw material being costly, extensive experiments on it cannot be conveniently made.—DR. URE.

A manufacturer of carmine, who was aware of the superiority of the French colour, went to Lyons for the purpose of improving his process,

and bargained with the most celebrated manufacturer in that city for the acquisition of his secret, for which he was to pay one thousand pounds. He was shown all the process, and saw a beautiful colour produced; but he found not the least difference in the French mode of fabrication and that which had been constantly adopted by himself. He appealed to his instructor, and insisted that he must have concealed something. The man assured him that he had not, and invited him to see the process a second time. He minutely examined the water and the materials, which were in every respect similar to his own, and then, very much surprised, said, 'I have lost my labour and my money, for the air of England does not permit us to make good carmine.' 'Stay,' said the Frenchman; 'don't deceive yourself. What kind of weather is it now?' 'A bright, sunny day,' replied the Englishman. 'And such are the days,' said the Frenchman, 'on which I make my colour. Were I to attempt to manufacture it on a dark or cloudy day, my results would be the same as yours. Let me advise you, my friend, always to make carmine on bright, sunny days.' 'I will,' rejoined the Englishman; 'but I fear I shall make very little in London!'—SIR H. DAVY.[1]

In the *Encyclopédie Roret* will be found no less than a dozen recipes for preparing carmine; the number of formulæ will convince the most superficial reader that the true form is yet withheld.

Analysis has taught us its exact composition; but a certain dexterity of manipulation and proper temperature are indispensable to complete success.

Most of the recipes given by Dr. Ure, and others, are from this source; but, as they possess no practical value, we refrain from reprinting them.

Mr. B. Wood patented the following method of making carmine, which may be very useful to some of our readers who have to pay a much higher price for this material than it would cost themselves to make it. Take 9 ounces of the

[1] [The writer of this little volume was first inspired in his chemical studies by reading the works of Sir H. Davy. When quite a boy he travelled on foot, with knapsack on back, from London to Penzance in Cornwall to see Davy's birthplace. Again he went to Geneva to see his tomb near to that of John Calvin, in the Cemetry of Plane Palais. The Davy Centenary Festival took place at Penzance on the 13th and 14th February, 1879.]

carbonate of soda and dissolve it in 27 quarts of rain water, to which are added 8 ounces of citric acid. When brought to the boiling point, 1½ lb. of the best cochineal, ground fine, are added, and then boiled for 1¼ hour. The liquor is then strained or filtered and set by to cool. The clear liquor is then boiled again, with 9½ ounces of alum, for about ten minutes, and is again drawn off and allowed to cool and settle for two or three days. The supernatant liquor is then drawn off, and the sediment which is fallen to the bottom is filtered and washed with clean, cold soft water, and is finally dried by evaporating all the moisture. The result is fine carmine, which can be made into the finest red ink by dissolving it in a caustic solution of ammonia, adding a little dissolved gum arabic.

By the old plan of making carmine, no citric acid was used; the cochineal was simply boiled in soft rain water for two hours, containing a minute quantity of carbonate of soda, then allowed to settle, and treated by remainder of the process as described above. An improvement in the brilliancy of the colour is obtained by adding about one-ninth part of the crystals of a salt of tin to the alum, using for this purpose a ninth part less of alum than the amount given above.

TOILET ROUGES

are prepared of different shades by mixing fine carmine with talc powder, in different proportions; say one drachm of carmine to two ounces of talc, or one of carmine to three of talc, and so on. These rouges are sold in powder, and also in cake on china pots; for the latter the rouge is mixed with a minute portion of solution of gum tragacanth. M. Titard prepares a great variety of rouges. In some instances the colouring matter of the cochineal is spread upon thick paper and dried very gradually: it then assumes a beautiful green tint. This

curious optical effect is also observed in 'pink saucers.' What is known as Chinese book-rouge is evidently made in the same way, and has been imported into this country for many years.

When the bronze-green cards are moistened with a piece of damp cotton-wool, and applied to the lips or cheeks, the colour assumes a beautiful rosy hue. Common sorts of rouge, called 'theatre rouge,' are made from the Brazil-wood lake; another kind is derived from the safflower (*Carthamus tinctorius*); from this plant also are made

PINK SAUCERS.

The safflower is washed in water until the yellow colouring matter is removed; the carthamine, or colour principle, is then dissolved out by a weak solution of carbonate of soda; the colouring is then precipitated into the saucers by the addition of sulphuric acid to the solution.

Cotton-wool and crape, being coloured in the same way, are used for the same purpose, the former being sold as Spanish wool, the latter as Crépon rouge.

A more beautiful and redder carthamine is obtainable by precipitation of the alkaline solution of the colouring matter with citric acid, instead of sulphuric acid. The rouge of the theatres is almost always made with carthamine.

SYMPATHETIC BLUSH OF SCHNOUDA.

Under the euphonious name of *Schnouda* an article for colouring the cheeks has been recently introduced into perfumery. I prefer to call it Sympathetic Blush, on account of its peculiar qualities.

In a chemical sense it possesses very great interest, and illustrates in one way how science is applied to the arts.

The colouring principle of this Blush is known to chemical

philosophers under the name of *Alloxan*, and was discovered by Liebig.

Alloxan is white, and is soluble in water; being mixed up with a greasy body after the manner of cold cream, a white cream results.

On exposure to the air by rubbing it upon the cheek, lips, or other 'situation,' the Alloxan gradually turns to deep rose-colour from the oxydising influence of the atmosphere. Used judiciously, it creates the most perfect delusion perpetrated by the toilet of fashion.

Alloxan was discovered by Liebig and Woehler. It crystallises in rhomboidal octahedrons.

BLUE FOR VEINS.

The arts of the toilet are carried to such desires that, unless the veins could at times be indicated by a faint blue vermicular line, there would still be a want for the perfumers to supply.

Blue wherewith to imitate the veins is made with exceedingly fine levigated French chalk, sifted through a silk sieve, tinted to the proper shade with Prussian blue, then made into a paste with very thin gum-water; when dry it is put up into pots into the same way as rouge.

After the complexion has been duly whitened with blanc, the veins are indicated with a little of the colouring applied with a pencil made of kid-leather, the inside of the skin being made the outside of the pencil.

Artistically used, the effect is pleasing and natural.

NAIL POWDER.

With moderate attention the finger-nails become greatly ornamental; but without it they are worse than a disfigure-

ment; in fact, the state of the finger-nails may be said to indicate either refinement or its absence. The nails should be cut at least once a fortnight, and a sharp penknife produces a smoother edge than scissors do. Some persons cannot cut the nails of the right hand, but this little difficulty is got over with a very little practice, and the left hand adapts itself readily where its services can be beneficially employed. Clean nails are so essential, that in England we never admit that a hand is clean, however well washed, unless the nails are clean also. Agnails are prevented by releasing the quick from its attachment to the nail about once a week. Some persons push the quick down with the towel every time they wash their hands; but small ivory 'nail-cleaners,' sold by perfumers, are greatly preferred. 'Biting the nails' is an offence against good manners, and richly deserves the punishment that it eventually brings with it, in the disfigurement it perpetuates. A pretty hand is greatly improved by careful attention to the nails, and even a hand which would otherwise be somewhat of a disfigurement to the person, is rendered pleasing to the eye, if proper attention be given to the nails. The best nail powder consists of pure oxide of tin perfumed with otto of lavender and tinted with carmine; it is sold in little wooden boxes of about one ounce each. It is applied either by rubbing it on the nail with the finger, or with a nail polisher covered with leather. As oxide of tin is employed for polishing tortoiseshell, we can easily understand how useful it is for horn and nails.

It is stannic acid or binoxide of tin that is used.

SECTION XVII.

TOOTH-POWDERS AND MOUTH-WASHES.

THE teeth should be fairly used, not made to perform the duties of crackers for nuts, nor to rival scissors in cutting thread; for, rest assured, the teeth so unwittingly injured will always be the first to part company from their fellows. Cleanliness is absolutely essential for the preservation of the teeth, and they should be well brushed at least morning and evening, that any feculence which may be attached to them, either during sleep from the stomach, or by day from meals, may not be allowed permanently to adhere, causing, firstly, discoloration, then tartar, and subsequently undermining the health of one or more, as from their position they may be more or less liable to corrosion. In order that the teeth should look natural—that is, retain their natural colour—a dentifrice free from the smallest particle of acid should be used in the morning, and the mouth rinsed with tepid water, for extremes of heat and cold are most highly prejudicial both to their colour and durability. The persons who habituate themselves to hot soup, tea, or other drinks, will be sure to suffer in their teeth. Brushes for the teeth should be of medium substance of bristle, and those made on what is called the penetrating principle are best. Children at an early age should be instructed in the use of the tooth-brush, and taught the value and importance of the teeth, in order to

inculcate habits of cleanliness and a due appreciation of the ornaments of the mouth. A brush properly selected, not too hard, may be used by children of five years of age every morning; and by being part and parcel of the general ablution, and thus directing habitual attention to the teeth, a useful and cleanly habit will be engendered which will probably ensure for them proper care through life.

The same kind of brush does not suit every one. Persons whose gums are congested and sensitive should choose soft brushes; and in case of ulceration, the sponge brush will likewise be the best; for those whose gums have lost their colour should prefer a rather rough brush to stimulate vital action. Moreover it will always be prudent and advisible to consult a dentist as to the kind of brush best in any particular case.

TOOTH-POWDERS,

regarded as a means merely of cleansing the teeth, are most commonly placed among cosmetics; but this should not be, as they assist greatly in preserving a healthy and regular condition of the dental machinery, and so aid in perfecting as much as possible the act of mastication. In this manner they may be considered as most useful, although, it is true, subordinate medicinal agents. By a careful and prudent use of them, some of the most frequent causes of early loss of the teeth may be prevented; these are, the deposition of tartar, the swelling of the gums, and an undue acidity of the saliva. The effect resulting from accumulation of the tartar is well known to most persons, and it has been distinctly shown that swelling of the substance of the gums will hasten the expulsion of the teeth from their sockets; and the action of the saliva, if unduly acid, is known to be injurious, if not destructive. Now, the daily employment of a tooth-powder sufficiently hard, so as to exert a tolerable

degree of friction upon the teeth, without at the same time injuring the enamel of the teeth, will, in most cases, almost always prevent the tartar accumulating in such a degree as to cause subsequent injury to the teeth; and a flaccid, spongy, relaxed condition of the gums may be prevented or overcome by adding to such a tooth-powder some tonic and astringent ingredient. A tooth-powder containing charcoal and cinchona bark will accomplish these results in most cases, and therefore dentists generally recommend such. Still, there are objections as to the use of charcoal; it is too hard and resisting, its colour is objectionable, and it is perfectly insoluble by the saliva; it is apt to become lodged between the teeth, and there to collect decomposing animal and vegetable matter around such particles as may be fixed in this position. Cinchona bark, too, is often stringy, and has a bitter, disagreeable taste. M. Mialhe highly recommends the following formula:—

Mialhe's Tooth-Powder.

Sugar of milk, one thousand parts; lake, ten parts; pure tannin, fifteen parts; oil of mint, oil of aniseed, and oil of orange-flowers, so much as to impart an agreeable flavour to the composition.[1]

His directions for the preparations of this tooth-powder are, to rub well the lake with the tannin, and gradually add the sugar of milk, previously powdered and sifted; and lastly, the essential oils are to be carefully mixed with the powdered substances. Experience has convinced him of the efficacy of this tooth-powder, the habitual employment of which will suffice to preserve the gums and teeth in a healthy state. This formula of Mialhe has been recommended especially when the teeth have been blackened by the chalybeates. It would, however, be useful in other cases.

For those who are troubled with excessive relaxation

[1] *Chimie appliquée à la physiologie et à la thérapeutique*, p. 637. Paris, 1856.

and sponginess of the gums, he recommends the following astringent preparation:—

Mialhe's Dentifrice.

Alcohol, one thousand parts; genuine kino, one hundred parts; rhatany root, one hundred parts; tincture of balsam of tolu, two parts; tincture of gum benzoin, two parts; essential oil of canella, two parts; essential oil of mint, two parts; essential oil of aniseed, one part.

The kino and the rhatany root are to be macerated in the alcohol for seven or eight days; and after filtration, the other articles are to be added.[1]

A teaspoonful of this preparation mixed in half a goblet of water should be used to rinse the mouth after the use of the tooth-powder. The word dentifrice is derived from *dens, frico*—a tooth, I rub.

Camphorated Chalk.

Precipitated chalk	1 lb.
Powdered orris-root	½ „
„ camphor	¼ „

Reduce the camphor to powder by rubbing in a mortar with a little spirit, then sift the whole well together.

On account of the volatility of camphor, the powder should always be sold in bottles, or at least in boxes lined with tinfoil.

Quinine Tooth-Powder.

Precipitated chalk	1 lb.
Starch powder	½ „
Orris „	½ „
Sulphate of quinine	1 drachm

After sifting, it is ready for sale.

[1] *Chimie appliquée à la physiologie et à la thérapeutique*, p. 638. Paris, 1856.

Prepared Charcoal.

Fresh made charcoal, in fine powder	7 lbs.
Prepared chalk	1 lb.
Orris-root	1 „
Catechu	½ „
Cassia bark	½ „
Myrrh	¼ „

Charcoal of white wood is generally preferred, and particularly that of poplar or willow.

Peruvian Bark Powder.

Peruvian bark, in powder	½ lb.
Bole ammoniac	1 „
Orris powder	1 „
Cassia bark	½ „
Powdered myrrh	½ „
Precipitated chalk	½ „
Otto of cloves	¼ oz.

Homœopathic Chalk.

Precipitated chalk	1 lb.
Powdered orris	1 oz.
„ starch	1 „

Cuttle-fish Powder.

Powdered cuttle-fish	½ lb.
Precipitated chalk	1 „
Powdered orris	½ „
Otto of lemons	1 oz.
„ neroli	½ drachm

Borax and Myrrh Tooth-Powder.

Precipitated chalk	1 lb.
Borax powder	½ „
Myrrh „	¼ „
Orris „	¼ „

Farina Piesse's Powder.

Burnt Horn	2 lbs.
Orris-root	2 „
Carmine	1 drachm
Very fine powdered sugar	½ lb.
Otto of neroli	½ drachm
„ lemons	¼ oz.
„ bergamot	¼ „
„ orange-peel	¼ „
„ rosemary	1 drachm

Rose Tooth-Powder.

Precipitated chalk	1 lb.
Orris	½ „
Rose pink	2 drachms
Otto of rose	1 drachm
„ santal	¼ „

All these powders are to be well sifted together; they are then ready for sale.

Opiate Tooth-paste.

Honey	½ lb.
Chalk	½ „
Orris	½ „
Carmine	2 drachms
Otto of cloves, „ nutmeg, „ rose — of each	½ drachm
Simple syrup	enough to form a paste

All powders employed unmixed for cleaning the teeth, and those which form ingredients in opiates, ought to be ground with the utmost carefulness.

We may remark that all English dentifrices are neutral or alkaline; and they are certainly to be preferred to the French powders, which usually owe their acidity to allum or cream of tartar. Such powders not only affect and destroy the enamel,

but they have the serious disadvantage of lodging in the cavities of the gums and frequently give rise to slight ulceration.

MOUTH-WASHES.

Violet Mouth-wash.

Tincture of orris	½ pint
Esprit de rose	½ „
Spirit	½ „
Otto of almonds	5 drops

This is a very nice preparation, and gives great satisfaction.

Eau Botot.

Tincture of cedar wood	1 pint
„ myrrh	¼ „
„ rhatany	¼ „
Otto of peppermint	15 drops
„ roses	10 „

Botanic Styptic.

Rectified spirit		1 quart
Rhatany-root	of each	2 oz.
Gum myrrh		
Whole cloves		

Macerate for fourteen days, and strain.

All these tinctures should be made with grape spirit, or at least wish pale unsweetened brandy.

Tincture of Myrrh and Borax.

Spirits of wine		1 quart
Borax	of each	1 oz.
Honey		
Gum myrrh		1 „
Red sanders wood		1 „

Rub the honey and borax well together in a mortar, then gradually

add the spirit—which should not be stronger than ·920, *i.e.* proof spirit, —the myrrh, and sanders wood, and macerate for fourteen days.

It exalts the flavour and expense, but it yet improves the quality of the result to employ half Cologne or Hungary water, in place of all spirits of wine.

Tincture of Myrrh with Eau de Cologne.

Eau de Cologne	1 quart
Gum myrrh	5 oz.

Macerate for fourteen days, and filter.

Camphorated Eau de Cologne.

Eau de Cologne	1 quart
Camphor	5 oz.

Turkish Pastil Lozenges.

For the use of smokers, or to prevent the taste of medicine. These lozenges are made thus :—

Fine sugar	4 lbs.
Citric acid	4 drachms
Otto of roses	5 drops
Grain musk	4 grains
Otto of vitivert	½ drachm

Gum tragacanth dissolved in water, enough to form the whole into a paste, tinted with liquid lake.

Aromatic Cashoo (Bologna) for Smokers.

Extract of liquorice by infusion	100 grammes
Water	100 „

Dissolve in water bath, and add 30 grammes of powdered cashoo, and 30 grammes of powered gum. Evaporate till it has the consistence of an extract and incorporate 2 grammes of each of the following substances, finely powered—mastic, cascarella, charcoal, orris. Well mix, take off the fire and add, 2 grammes of essence of English mint, 5 drops of tincture of musk, and

5 drops of tincture of amber. Pour upon an oiled marble surface, and spread out with a roller into plates.

When the mass is cooled, rub with unsized paper, in order completely to remove the oil from both surfaces; then moisten slightly with water, and place over each a leaf of silver. When dried, cut into very narrow strips, then into small squares or lozenges.

SECTION XVIII.

HAIR-WASHES.

AS a general rule, society does not use enough pomades and hair oils; hence the number of rough-looking heads of hair that are to be seen when men are assembled together with their 'hats off,' as in a court of justice and similar places of public resort. In boarding-schools, in vain are soap and water employed to destroy an odious parasite, whose name need not be mentioned; but which is never seen or heard of where the toilet is liberally supplied with good pomade or oil. On the other hand, there are persons whose hair is so naturally moist and greasy that no kind of unguent is required. Such hair is very liable to come off, to be thin, lank, and pliable; whereas good hair should always have a certain amount of 'woolliness' in it, to give that appearance of life and vigour so becoming in curly locks, and the excess of which is a negro head. Thin and naturally greasy hair requires a wash to keep it in nice order: and if the hair is falling off, either from sickness or natural decay, the wash should be astringent and stimulant.

Rosemary Water.

Rosemary, free from stalk	10 lbs.
Water	12 gallons

Draw off by distillation ten gallons for use in perfumery manufacture.

Rosemary Hair-wash.

Rosemary water	1 gallon
Rectified spirit	½ pint
Pearl-ash	1 oz.

Tinted with brown colouring.

Bay Rum.

This is a very good hair-wash. It was first introduced in New York by those go-a-head scissors, that 'abbreviate' the 'crown of glory.'

Tincture of bay leaves	5 oz.
Otto of bay	1 drachm
Bicarbonate of ammonia	1 oz.
Biborate of soda (borax)	1 „
Rose-water	1 quart

Mix and filter.

Athenian Water.

Rose-water	1 gallon
Alcohol	1 pint
Sassafras wood	¼ lb.
Pearl-ash	1 oz.

Boil the wood in the rose-water in a glass vessel; then, when cold, add the pearl-ash and spirit.

Instead of the pearl-ash I should prefer the Panama wood, which would make a better head of hair.

Vegetable or Botanic Extract.

Rose-water	of each	2 quarts
Rectified spirit		
Extrait de fleur d'orange	of each	¼ pint
„ jasmin		
„ acacia		
„ rose		
„ tubereuse		
Extract of vanilla		½ „

This is a very beautifully scented hair-wash. It retails at a price commensurate with its cost.

Astringent Extract of Roses and Rosemary.

Rosemary water	2 quarts
Esprit de rose	½ pint
Rectified spirit	1½ „
Extract of vanilla	1 quart
Magnesia, to clear it	2 oz.

Filter through paper.

Glycerine and Cantharides Lotion. (*For the Hair, if falling off.*)

Mr. Startin has published the following, which is stated to be of great service.

Rosemary water	1 gallon
Spirits of sal volatile	1 oz.
Tincture of cantharides	2 „
Glycerine	4 „

To be used with a sponge or soft hair-brush twice a day.

Lotion for the Hair, as recommended by Dr. Locock.

Liquor of ammonia, Oil of sweet almonds, of each	2 drachms
Spirits of rosemary	1 oz.
Otto of mace	½ drachm
Rose-water	2½ oz.

First, mix the almond oil with the ammonia; then, having added the otto of mace (essential oil of mace) to the rosemary, shake these up with the oil and ammonia; finally, add the rose-water by degrees.

It is used as a lotion, and applied once a day at the toilet hour. This compound is a stimulant, and was made at the suggestion of her Majesty's physician for promoting the growth of the hair and preventing its falling off.

Saponaceous Wash, or Egg Julep.

Rectified spirit	1 pint
Rose-water	1 gallon
Extract of rondeletia	½ pint
Transparent soap	½ oz.
Hay saffron	½ drachm

Shave up the soap very fine; boil it and the saffron in a quart of the rose-water; when dissolved, add the remainder of the water, then the spirit, finally the rondeletia, which is used by way of perfume. After standing for two or three days, it is fit for bottling.

By transmitted light, it is transparent; but by reflected light the liquid has a pearly and singularly wavy appearance when shaken.

In preparations or washes for the hair, castor-oil is now frequently employed. It produces an unequalled brilliancy; but it is necessary to select for the purpose a freshly made oil, otherwise its odour is disagreeable, and difficult to disguise, especially on the head where it is easily heated. Castor-oil, it should be remembered, is soluble in spirit: the article known as

Euchrysma.

Is made thus—

Any scented spirit	1 pint
Castor-oil	2 oz.

BANDOLINES.

Various preparations are used to assist in dressing the hair in any particular form. Some persons use for that purpose a hard pomatum containing wax, made up into rolls, called thence *Bâton fixateur*. The little 'feathers' of hair, with which some ladies are troubled, are by the aid of these bâtons made to lie down smooth.

The liquid bandolines are principally of a gummy nature, being made either with Iceland moss, or linseed and water variously perfumed, also by boiling quinceseed with water. Perfumers, however, chiefly make bandoline from gum tragacanth, which exudes from a shrub of that name which grows plentifully in Greece and Turkey.

Rose Bandolines.

Gum tragacanth	6 oz.
Rose-water	1 gallon
Otto of roses	½ oz.

Steep the gum in the water for a day or so. As it swells and forms a thick gelatinous mass, it must from time to time be well agitated. After about forty-eight hours' maceration, it is then to be squeezed through a coarse linen cloth, and again left to stand for a few days, then passed through the cloth a second time, to insure uniformity of consistency; when this is the case, the otto of roses is to be thoroughly incorporated.

The cheap bandoline is made without the otto; for coloured bandoline, it is to be tinted with ammoniacal solution of carmine, i.e. *Bloom of Roses*; or with roseline for rose tint, and aniline for violet tint.

Almond Bandoline

is made precisely as the above, scenting with a quarter of an ounce of otto of almonds in place of the roses.

CRÈME DE MAUVE, OR HAIR GLOSS.

This preparation serves the double purpose of a dressing for the hair and as a *fixateur*. It is especially made for giving gloss and brilliancy to the hair, when an engagement requires that the tresses and curls should appear particularly elegant, as at a ball, soirée, or the opera, and is made thus:—

Pure glycerine	4 lbs.
Spirit of jasmine	1 pint
Aniline	5 drops

In concluding this section, we now terminate our remarks on the manufacture of odorous substances, and their application to the toilet of fashion and beauty.

To be 'in good odour' denotes moral purity. To employ

a special odour, in its material sense, according to circumstances—age, joy, sorrow—is the suggestion of the late Dr. Andrew Wynter of Chiswick. 'Why,' says he, 'should we not know our fair friends by the delicate odours with which they are surrounded, as we know them afar off by the charm of voice? There is an appropriate odour, to our minds, to each particular character. The spirituelle should affect jasmine; the brilliant and witty, magnolia; the robust, the more musky odours; and young girls just blooming into womanhood, the rose. The citron-like perfumes are more fitted for the melancholy temperature, and there is a sad minor note in heliotrope that the young widow should affect.'

The great Creator, in addition to utility, has added beauty and variety in all His works. Flowers might have been of one colour and the same odour, or they might have been colourless or inodorous.

Yet what exquisite beauty and diversity of perfume is there in plants and flowers! The love of this beauty and perfume is universal. Man is adapted to appreciate the gifts which the beneficent Creator has spread before him in such rich variety; the gratification arising from this enjoyment, as it is among the most innocent and purest, so it is the most pleasing and permanent that he enjoys.

The great Teacher, when speaking of the lilies, says that 'Solomon in all his glory was not arrayed like one of these;' and when setting forth his own excellences and glory, says, 'I am the Rose of Sharon.'

> Nor the sweet smell
> Of different flowers in odour and in hue
> Can make me any longer story tell.
>
> SHAKESPEARE.

SECTION XIX.

OF THE COLOURS USED BY PERFUMERS.

THE various toilet requisites manufactured by the perfumer must not only smell nicely, produce a pleasing sensation to touch, but they must also gratify the eye,—in fact, they must be 'pretty;' this effect is gained by the addition of colour.

The colour employed must be in harmony and appropriate to the article to which it is applied. Thus, *Rose* mouth-wash should be tinted of a beautiful blush colour; *Savon de Tridace*, or lettuce soap, is to be coloured green; and so on. The proper occasion to employ colour does, however, in a measure rest with the taste of the *chef* of the laboratory; and so long as the colour of the article is in unison with the idea of its nature, there is no objection to its free employment, provided the colouring matter is of a harmless character when applied to the skin.

In this respect modern perfumers have considerable advantage over their predecessors: chemistry has supplied them with colours not only rich in tint, but of a harmless nature; nay, more, for we can now colour certain substances of tints, which, but so short time ago as when the first edition of this work was published, it was impossible to accomplish. Up to the time of Mr. Perkins's patent for the application of aniline, and its derivatives, to dyeing, there were but very few organic substances applicable for colouring perfumery.

Mineral colours of course there are plenty; but the majority of them are of a poisonous nature, and cannot therefore be employed in the laboratory of a perfumery factor. Under the name of the colour, the several substances that can be so tinted will be mentioned.

GREEN.—*Alcohol* may be coloured green by infusing in it the dried leaves of almost any plant or herb—the leaves of spinach, sage, grass, hay, and numerous others, being either sun-dried or artificially dried, with a current of warm air, and then put into the spirit, will colour it of various beautiful shades of green. The pomades of violet and acacia also colour spirit green by maceration, but the more beautiful the tint as a rule the older is the pomade or the tincture; fresh spirit of acacia or violet is of a brown-green tint, but if it has been prepared for some time, being more or less exposed to the air, then it passes to a spring-grass green colour, and the perfume is deteriorated.

Green coloured perfumery is much admired; hence a little acacia is often used in a bouquet on account of its tint.

Oils and *pomades* may be coloured GREEN thus: dried spinach or other leaves are put into rectified spirits of wine, the spirit rapidly dissolves out the green colouring matter of the plants, called chlorophyle; the spirit being then pressed away from the spent leaves, is to be put on to more leaves, and again pressed out when the colouring is dissolved: this operation repeated several times with the same spirit it will become of a rich deep green colour, on account of its holding the chlorophyle in solution. When the quantities operated upon are large, and it is essential to save the spirit, the tincture may be placed into a retort or still, and then distilled at a low temperature. Steam distillation is best. The green residuary extract that remains after the spirit is evaporated being now triturated with oil or fat, will colour the grease of a pretty green.

Watery fluids, milks, &c., may be tinted of a beautiful GREEN with a green solution of dye recently introduced by Messrs. Judson, of Cannon Street.

Soap may be coloured GREEN by making in the melting-pan a judicious mixture of soap, containing from seven pounds to fourteen pounds of new palm oil to every hundredweight of soap. This produces a good yellow body soap. To this we add one, two, or three ounces of blue smalt, or of ultra-marine blue, mixed with half a pint of water. The blue colour and the yellow soap produce, when crutched together, a vegetable green tint. Green soaps are sometimes produced with salts of copper, chromate of potass, and chromate of lead. These materials being all pernicious, manufacturers using them ought to be publicly fined.

Powders may be coloured GREEN by employing the dried powders of fresh herbs, such as parsley, spinach, bay leaves, &c., mixed with starch.

Azure, Prussian blue, and Indigo blue may be used without danger.

YELLOW.—Saffron, palm oil, and turmeric. are the principal yellow stains used by perfumers.

Alcohol may be coloured YELLOW, or rather of a beautiful uranium-glass tint, by the maceration of jonquil pomade ; the pollen of the flowers in the first place imparts its tint to the grease, which, in turn, is given up to the spirit. Alcohol may be dyed yellow by infusing in it the turmeric root (*Curcuma longa* of India), the well-known condiment, mixed in curry powder, &c.

Watery lotions and *emulsions* may be conveniently coloured YELLOW with saffron, which consists of the stigmata of the yellow crocus blossom. Saffron-Walden, a town in Essex, received its prefix on account of the saffron gardens which at one time were extensively cultivated there.

Pomades are best coloured YELLOW by jonquil pomade,

rose pomade, or palm oil; the latter is the most economical, but the two former are far more agreeable to the smell. Rose pomade has a tint of a deeper yellow than the jonquil, but is not equal in colouring power to palm oil. The rose pomade receives its tint from the pollen of the roses, with which it is made in the same way as jonquil, *i.e.* maceration.

It is difficult to stain oils of almost any colour except red and purple; we know of nothing that will colour oil yellow artificially.

Palm 'oil' being in fact not an oil at all in this country, but always more solid than butter, and opaque, will not serve for colouring oil yellow.

RED, ROSE, VIOLET, and MAUVE.—All these tints may be conveniently considered together, because the mode of obtaining them is from one and the same source—namely, aniline.

Alcohol receives from the variety of aniline colours all the shades a perfumer can desire; the smallest distinction in the shade of a colour is sufficient to require a special name to indicate it. The two most famous tints which approach the rose and red in the aniline series are known as *Magenta* and *Solferino*, so named from the towns in Italy, where the battles were fought between the French, Piedmontese, and Austrians.

Oils, *fats*, *wax*, and *spermaceti*, may be easily coloured RED with the roots of the *Anchusa tinctoria*, commonly called alkanet root, and for this purpose the plant is cultivated to a considerable extent in the south of France about Montpellier, and also in Turkey in Asia.

In order to colour oil, one, two, or three pounds of alkanet root are broken up and put into a vessel, which can be placed into hot or boiling water. The root is then covered with either olive or almond oil, and kept hot for several days; after which time the oil is strained away from the root, and preserved in a bottle under the name of 'red colouring.' If the

colour desired be not deep or intense enough, then the same oil must be put on to fresh root two or three times, or until, in fact, it is suitable to the desired wants.

A portion of 'red colouring' thus made, is at all times convenient as a source or material to tint pomatums and oils of shades varying from rosy to crimson.

About 15,000 pounds of alkanet root are imported annually into this country.

Oils and other *greasy bodies* may be coloured also of VARIOUS TINTS by agitating them with the alcoholic solution of all the aniline series, solferino, mauve, &c. After the oils, &c., have taken up the colour, the spirit must be dissipated with heat or subsidence; we are thus, for the first time, able to stain fatty bodies of various shades from violet to a blush rose.

A still more simple and economical method is to dissolve the aniline in a certain quantity of glycerine, and then to make use of the solution for colouring fatty bodies, oils and pomades.

Glycerine may also be coloured of the most lovely tints by these colouring matters,—Simpson's MAGENTA, and Perkins's MAUVE, proving the most useful.

Watery fluids take the tints of mauve, magenta, solferino, to any shade.

Milks and *emulsions* take these colours well, if not kept too long; but if made some time, the colouring gradually subsides in combination with the amygdaline of the almond or pistachio-nut from which the emulsion is made.

REDDISH-BROWN.—*Alcohol* is best coloured of a *red-brown* tint with rhatany root. Rhatany is the *Krameria triandra* of botanists, and is principally imported from Peru; there is, however, another variety of nearly similar properties that comes from the Antilles or Caribbee Islands,—this is the *Krameria ixina*; both are bushy shrubs, and are cultivated for the sake of the root, yielding as it does a beautiful colour

to spirit, and on account of its flavour, extensively employed for making fictitious port wine ; this root is also employed in tooth powders, which see.

Another very good RED-BROWN tint is obtained in alcohol, by making a tincture of red santal wood or red sanders in the vernacular. Red sanders is the wood of the *Pterocarpus santalinus*, a tree natural to the Coromandel Mountains, largely imported for the use of dyers, together with another variety, *Pterocarpus flavus*, yellow sanders, which yields a yellow tint to spirit. Cedar wood yields a good red tint to spirit, and is employed to some extent in liquid dentifrices by the French perfumers.

Soaps are coloured of a red brown and dark brown, with powdered burnt sienna and umber ; but neither of these are so well to employ, for many reasons, as the following :—

BROWN.—Burnt sugar or molasses, boiled in an iron vessel to the burning point, being dissolved in lime water, is the 'brown colouring' of perfumers, and 'caramel' of confectioners. This colour is suitable for tinting *soap* and *hair washes* of any desired shade ; but as it is not soluble in either grease or spirit, it does not impart colour to them.

BLACK.—There is no true soluble black for either *water* or *spirit* ; but Indian or Chinese ink remains suspended in these liquids longer than any other substance.

Grease and *Soap* can only be coloured BLACK, economically, with lamp-black, first rubbed with oil, then added to the soap or grease in quantity sufficient to produce the desired shade. Instead of lamp-black, the charcoal of cork is often used.

SPONGE.

The best sponges imported are received from Smyrna, and from the shores of the islands in the Grecian Archipelago. When imported, they are full of sand, and in this state it is the best way to purchase them; then afterwards to beat out the sand with a stick, and well rinse them in cold spring water. Nothing is better adapted for cleansing the skin than a good sponge; hence surgeons prefer it to any other material. In the regular way of using a sponge with soap for washing, they rapidly become *greasy*, and are then frequently thrown aside, before half worn out. The peculiar cellular fibrous tissue of sponge enables it to decompose the soap, retaining the grease and oil, which render it *slimy*; when such is the case, a ley of soda should be prepared, of the strength of half a pound of soda to half a gallon of water, and the sponge placed to soak in it for twenty-four hours; it should then be washed, and well rinsed in SPRING WATER, and afterwards in water containing a little muriatic acid (a wineglassful of the acid to half a gallon of water is strong enough). Finally, again rinse the sponge in plenty of spring water. The best sponge being worth from 40*s*. to 80*s*. per pound, renders it fully worth while to keep them clean. If trouble be taken to *well rinse* a sponge every time after using, the cleaning process will rarely be necessary.

M. Lamiral distinguishes three kinds of sponges for which there is a demand—the fine and soft sponge, called *abiand*; the fine and hard sort, called *achmar*; and lastly, the common sort, called *cabar* by the Arabs. These sponges are found in the Levant within the 36th and 33rd degrees of latitude, that is, between Alexandretta and Saida. It is now universally acknowledged that sponges belong to the animal kingdom, and are an aggregate of cellules built up by gelatinous polypi similar to those which construct madreporæ, porites, and other polypifers. When the sponge is first gathered at the bottom of the sea, it is covered

with a black but transparent gelatinous substance, resembling vegetable granulations, among which microscopic white and oviform bodies may be distinguished. These are the lavæ destined to perpetuate the species. When arrived at maturity, they are washed out by the sea-water which incessantly flows through the sponge ; they then swim along, by the aid of the vibrating cilia or hairs with which they are provided, until they reach a suitable rock, to which they attach themselves, and there commence a new life. This emigration of the lavæ from the parent sponge occurs about the end of June and beginning of July. The fine qualities of sponges are chiefly found at a depth of 15 fathoms or thereabout ; the common sponge lies at depths varying between 20 and 30 fathoms.

The quantity of sponge imported into Great Britain in 1860 :—

	Quantity	Computed Value
	732,890 lbs.	£285,919
Exported	273,588	48,025
Used at home	459,302	£237,894

OTTOS FROM PLANTS.

Quantities of Ottos, otherwise Essential Oils, yielded by various Plants.

	lbs.		of otto
Orange-peel	10	yield about	1 oz.
Dry marjoram herb	20	„	3 „
Fresh „ „	100	„	3 „
White peppermint	100	„	12 „
Black „	100	„	16 „
Dry origanum	25	„	2 to 3 „
„ thyme	20	„	1 to 1½ „
„ calmus	25	„	3 to 4 „
Anise-seed	25	„	9 to 12 „
Caraway	25	„	16 „
Cloves	1	„	2½ „
Cinnamon	25	„	3 „
Cassia	25	„	3 „
Cedar wood	28	„	4 „
Mace	2	„	3 „
Nutmegs	2	„	3 to 4 „
Fresh balm herb	60	„	1 to 1½ „
Cake of bitter almond	14	„	1 „
Sweet flag root	112	„	16 „

	lbs.				Otto
Geranium leaves	112	yield about		2	oz.
Mitcham lavender	100	"		32	"
Lavender flowers	112	"	30 to	32	"
Myrtle leaves	112	"		3	"
Patchouli herb	112	"		28	"
Provence rose blossom	112	"	1½ to	2	drachms
Rhodium wood	112	"	3 to	4	oz.
Santal wood	112	"		30	"
Vitivert or ius-icus-root	112	"		15	"
Violets	112	"		½	drachm
Hops, New Kent	100	"		4	drachms
" Bavarian, 3 years old	100	"		8	"
" Sussex, late picking	100	"		2½	"

Boiling and Congealing Temperatures of various Ottos, &c.

	Fahrenheit
Almond oil will not boil	+ 660°
Otto of patchouli boils	+ 515°
" vitivert "	+ 548°
" santal wood boils	+ 550°
" cedar wood "	+ 507°
English lavender boils	+ 475°
" lemon-grass "	+ 440°
" rose pure Turkish boils	+ 432°
" geranium Spanish "	+ 430°
" " Indian "	+ 420°
" gaultheria "	+ 400°
" almonds "	+ 356°
" bergamot (pure) "	+ 370°
" caraway "	+ 348°
" lemon peel "	
" orange " "	+ 345°
" French lavender (spike)	+ 180°
" white wax melts	+ 150°
" camphor sublimes	+ 145°
" spermaceti melts	+ 112°
" paraffin A	+ 102°
" " B	+ 90°
" otto rose (Italian) congeals	+ 62°
" " (Turkish) "	+ 58°
" geranium, neroly, cloves, deposit crystals	+ 2°
" santal, cedar, lemon-grass, congeal to a jelly	— 5°
" bergamot congeals	— 12°
" cinnamon still fluid	— 13°

SECTION XX.

FOREIGN TARIFFS ON PERFUMERY.

THERE is considerable difficulty in obtaining a correct statement of the duties levied on perfumery at foreign ports, because, in nearly every instance, perfumery is not recognised in its distinctive character, but is subdivided into the various materials of which it is composed, and even into the various articles into which it is put up for sale. Thus scent pays one duty, and the bottles in which it is packed another. Here pomatum, coming in a plain jar, has one tariff; but if in an ornamented, or gilt edged jar, the tariff is different. There, the duty is according to weight; here, according to its stated value.

Each and every Government suffers a loss of revenue, checks that intercourse which commerce engenders, stifles the desire inherent in all species, to procure and possess the products of foreign countries, by imperfectly taxing the commodities desired by the people. For instance, Russia levies a duty of one rouble the pound on essences, if in bulk, that is, if in such quantities that no retail purchaser could be found for it; but if the same be in small bottles, such as is *customary to the trade*, then the duty levied is three roubles! Dealers evade this latter impost by importing the essences in bulk, in tin cans, in one parcel, and the bottles in which it is to be

eventually sold in another parcel. Thus the government realise only the lesser duty, and exporters and importers are put to considerable trouble and inconvenience, tending to stay the progress of trade, much to the detriment of that government, whose object should be to increase trade.

America, North or Federal States.

Ambergris	Free
Balm of Gilead	30 per cent.
Balsam of Tolu	„ „
„ all kinds	„ „
Bay water or rum	25 cents per gal.
Beans, Tonquin	10 per cent.
Camphor, refined	20 „
„ crude	Free
Cascarilla	10 per cent.
Civet	20 „
Cologne water	50 per cent.
Essence, all	„ „
Flower water, orange	„ „
Hungary water	„ „
Lavender flowers	30 „
„ water	„ „
Lotions, all cosmetique	50 „
Manna	10 „
Milk of roses	30 „
Musk	„ „
Odours or perfumes	50 „
Oils, essential, volatile, or expressed	20 „
Paste, perfumed	50 „
Perfumes	„ „
Pomatum	„ „
Rose leaves	„ „
„ water	„ „
Rouge	„ „
Safflower	Free
Soap	30 per cent.
Sponge	10 „
Storax balsam	30 „
Vanilla beans	10 „

Antigua.

All spirits	5*s.* per gallon.
Soap	½*d.* per lb.
General perfumery	6 per cent. *ad v.*

And in addition to the above, an extra duty of 12½ per cent. all round *ad v.*

Argentine Republic.

The import duty of the Argentine Republic on perfumery of all kinds is 40 per cent.

Australia, South.

Perfumed spirit, per proof gallon by Sykes's hydrometer	10*s.*
Scented and fancy soaps, and general perfumery	10 per cent. *ad v.*

Australia, West.

Perfumed spirit	14*s.* per gallon.
Scented soap and general perfumery	10 per cent. *ad v.*

Austria.

Perfumery of all denominations, scented soap, &c., are taxed with an import duty of

5 florins per 112 lbs. when imported in vessels of not larger size than 1 pint English.

When imported in casks or boxes, a tare of 23 per cent. on the total weight is allowed.

For the value of an Austrian florin, and other foreign coin, see Table at p. 461.

Austrian Consulate,
29 St. Swithin's Lane.

Barbadoes.

Soap 1*s.* 0½*d.* per 100 lbs. and 3 per cent. *ad v.*

Belgium.

Perfumed spirit pays 102 francs the hectolitre. Scented soaps 6 francs the 100 kilogrammes.

Brazil.

POMADES.

In sticks, such as fixature, in paper, in pots, or in glass, 600 reis per lb. gross weight.

Tare allowed for pots, or bottles, or glass or earthenware, 50 per cent. In tinfoil 5 per cent.

OILS.

30 per cent. *ad valorem.*

If in bottles, either of glass or earthenware, to pay an extra 50 per cent. on the above duty.

Other perfumery, not classified, 400 reis per lb.

Same extra duty if in pots and flasks, either glass or earthenware.

Tooth powder 600 reis per lb. gross weight.

Rouge „ „ with extra duty for pots, &c.

SOAPS.

240 reis per lb. gross weight.

An allowance of 20 per cent. tare if in pots or tins.

In cardboard boxes, paper covers, &c., no tare allowed. Pay on gross weight.

Canada, 1871.

Alcohol	$1 per gallon.
Perfumed spirit in bulk	$1 50 cents per gallon.
Ditto in flasks of not more than 4 oz. .	25 per cent. *ad v.*
Fancy soaps and general perfumery .	25 per cent. *ad v.*
Common soap	2 cents per lb.

Cape Town.

Perfumed soap	10*s.* per 100 lbs.
Ordinary „	3*s.* „ „
Perfumed spirit	7*s.* 6*d.* per gallon.
„ oils	6*d.* per lb.
Other goods	10 per cent *ad v.*

Ceylon.

Spirits proof to 10° over	3rs. per gallon.
„ 10° to 20° „	3rs. 50 cents „

And so on 50 cents for every additional 10° over.

General perfumery	5 per cent *ad v.*

Chili.

According to Chilian tariff, perfumery assorted (*Perfumeria surtida*) pays an import duty of

25 per cent. *ad valorem.*

Chilian Consulate,
43 Moorgate Street.

Columbia and Nicaragua.

Perfumery pays *ad valorem* duty of 50 per cent.

Costa Rica.

The import duty into Costa-Rica on soap &c., is as follows :—

Common soap in bars and other shapes 2½ cents per lb. gross, including the packing and 50 per cent. additional.

Fine common soap 5 cents per lb. gross, including the packing and 50 per cent. additional.

Musk 25 cents per oz. gross, including packing and 50 per cent additional.

General perfumery 15 cents per lb. gross, including packing and 50 per cent. additional.

The scented spirit is not specified by itself, but may be included in 'general perfumery.'

Denmark.

The Danish import duty on perfumery is charged under the following heads :—

	Danish lb.	Danish Money		English Money		
		rsd.	*skg.*	£	*s.*	*d.*
Balsam of Tolu and Peru . . .	1		52		1	2½
Storax	1		9		0	2¼
Camphor	1		22		0	6½
Benzoin and myrrh	1		8		0	2¼
	Danish					
Musk	oz.		56		1	4
Bergamot, cinnamon, and other ottos .	1 lb.		49⅗		1	2
Pomatum in plain pots	100	15		1	13	6
„ gilt and coloured . . .	100	30		3	7	6
Soaps, fine scented	1		25		0	6¾
„ common	100	4	8		9	
Sponge	1		12⅘		0	3½
Starch or violet powder	100	5			11	3
Spirituous essences	1		25		0	7
Distilled waters	16		76⅘		1	9½

Bottles containing fluids are allowed as emballage or tare, the contents only being chargeable with duty.

The Danish lb. is equal to 17⅗ oz. English. The rsd. = 2*s.* 2½*d.* The skg. = ¼*d.*

Danish Consulate-General,
6 Warnford Court, E.C.

France.

As in several other countries, perfumery entering France in foreign ships has to pay a slight extra duty to that entering by a French vessel; thus—

	French Ships	Foreign Ships	
Spirituous essences pay	150f.	160f.	per 100 kilos.
Scented vinegars, &c., without alcohol .	100f.	107f. 50c.	,,
Scented soaps[1]	6f.	6f.	,,
Powders, unscented	25f.	27f.	,,
Scented powder from the Island of Cyprus	9f.	9f. 90c.	,,
Scented powders	184f.	194f.	,,
Pomatums	123f.	131f. 60c.	,,
Liquids and pastes of all kinds . .	25f.	27f. 50c.	,,

Gambia.

Perfumed spirit	1*s.* 6*d.* per gallon.
General perfumery	2 per cent. *ad v.*

German Empire.

10*s.* per cwt. (112 lbs.) upon all kinds.

Consulate General,
Bloomfield St. London Wall, E.C.

Gold Coast.

Perfumed spirit	2*s.* 6*d.* per gallon.
General perfumery	10 per cent. *ad v.*

Hawaii, Owyhee, Sandwich Islands.

The duties levied on perfumery by the last Hawaiian tariff are as follows :—

$3 per gallon on articles containing alcohol or spirit of the strength of 30 per cent. and upwards.

$1.50 per gallon on articles containing above 18 per cent., and under 30 per cent. alcoholic strength.

Articles containing spirit below 18 per cent. strength, and all other articles, 10 per cent. *ad valorem.*

The dollar ($) is equivalent to 4*s.* 2*d.* English.

Hawaiian Consulate,
4 Royal Exchange Buildings, E. C.

[1] Prior to the Cobden Treaty, sweet soap paid an import duty of 164f. per 100 kilogrammes.

Hayti (St. Domingo).

The following is extracted from the latest printed tariff:—

Trunks or boxes of perfumery, 2 feet long, by 1 foot wide	$2 50

Cases larger than the above charged with a proportionate duty.

Scented soap, per 100 lbs.	$1 25 cents.
Tooth powder, per dozen boxes	40 „
Pomades, in ordinary small pots	25 cents per dozen
„ in large pots or tin cases	20 „ lb.
„ in glass jars	50 „ dozen
Cologne, in flasks	12 „ „
„ in large square bottles	25 „ „
„ in half-bottles	40 „ „
Lavender, „	48 „ „
Eau de Senteur	20 cents each
„ in small bottles	50 „ per dozen

India—Bombay, Madras, Calcutta.

Perfumed spirit of more than 10 ounces in bulk, 4 rupees per gallon. If in smaller bottles, of less than 10 ounces, 5 per cent. *ad valorem.*

Italy.

The import duty on perfumeries into Tuscany and Piedmont is—

60 lires nuova	per 100 kils.

Each lire is equal to 8*d.* English.

Italian Consulate-General,
31 Old Jewry.

Jamaica.

All spirituous compounds	10*s.* per gallon.
Soap	5*s.* 6*d.* per 100 lbs.
General perfumery	12½ per cent. *ad v.*

Mauritius.

Perfumed spirit per proof gallon by Sykes's hydrometer 96 cents per litre.
General perfumery 7 per cent. *ad v.*

Mexico and Salvador.

Perfumery, pomatum, &c., &c., of all classes :—

For every 100 lbs. gross weight $18
Fine toilet soaps of all classes per quintal[1] $24

Netherlands.

The duty on the importation of perfumery into the Netherlands is—

6 per cent. *ad valorem.*

Netherlands Consulate-General,
Mansfield Buildings, E.C.

New South Wales.

Perfumed spirit per proof gallon by Sykes's hydrometer 10*s.*

New Zealand, 1878.

Perfumed spirit per proof gallon by Sykes's hydrometer 12*s.*
Scented soap and general perfumery . . 10 per cent. *ad v.*
Common soap 3*s.* 6*d* per cwt.

Portugal.

Soap, of all qualities, in bulk 25 reis per kilo.
„ in cakes 150 „
Eau de Cologne, gross weight, excepting porcelain and glass 300 „

[1] Quintal = 98lbs. English.

Waters, not alcoholic	50	reis per kilo.
Pomades, aromatic	500	„
Powders for the teeth	250	„
Aromatic vinegars, including in the weight the tare, except those of porcelain and glass	300	„
Spirits, aromatic	250	„
Essences and essential oils of all qualities	500	„
Pastiles and sticks for burning, odoriferous	500	„
Sticks and roots, odoriferous, for perfumery	250	„
Musk	15,000	„

All articles not included 30 per cent. *ad valorem*.

20 reis = 1 penny.

Queensland.

Scented spirit, spec. grav. ·825, temperature 60° Sykes's hydrometer	10*s.* per gallon.
General perfumery	5 per cent. *ad v.*

Russia.

According to the Russian tariff of June 9, 1857, the duty on perfumery and cosmetics, as enumerated, is—

10 roubles the poud weight (Russian) on Eau de Cologne, Eau de la Reine de Hongrie et Eau de Mélissa ; en flaçons et vases ordinaires, the duty is 30 roubles the poud.

Perfumery imported in ornamental bottles, with either gold, silver, or metal caps, or other ornaments, have to pay the same duty as in ordinary bottles.

The rouble is = to 3*s.* 1½*d.*

9 Russian pouds = to 10 English pounds.

Spain.

There is but one general article in the Spanish tariff referring to perfumery, and it is to the following effect :—

Art. 869. Perfumery in scented oils or waters,[1] creams, or fancy soaps, with or without scent, opiates, lozenges, powders, pomades, and other similar articles, including, as chargeable with duty, the weight of boxes, papers, and inside packages (pots, bottles, &c.).

Import duty per pound, Spanish :—

3 reals 20 cents in Spanish ships
3 „ 80 „ in any other flag.

The real is equivalent to 2½*d.*

Spanish Consulate-General,
1 Cushion Court, E.C.

Switzerland.

Spirituous essences, pomades, cosmetiques, rouge, scented oils, tooth powders, toilet powder, fumigating ribbon, &c.	30f.	the 100 kilos.
Musk, either in grain or in pod, ambergris, rose-water, and others	7f.	„
Otto of rose	30f.	„

If the Swiss tariff of other articles possesses the same anomaly as it does in perfumery articles, it is evident its authors know very little of the ways and means of raising a revenue.

Tasmania.

Perfumed spirit	12*s.* per gallon.
General perfumery	5*s.* per cubic foot.

Trinidad.

Spirits of all kinds	7*s.* per gallon.
Soap	1*s.* 6*d.* per 100 lbs.

[1] The term 'water,' in perfumery, has a technical sense, and means literally 'spirit;' hence we have *Eau* de Cologne, Hungary *water*, &c., which contain none of the *aqua pura!*

Venezuela.

The printed tariff of Venezuela, dated 1859, states that perfumes of all classes were charged—

$2½ per arroba = 56 lbs. English,

which included the bottles and boxes in which they are packed.

The duties have, however, since that date been increased, but to what extent I am unable to say.

Victoria, 1877.

Perfumed spirit	20*s.* per gallon.
General perfumery	10 per cent. *ad v.*
Yellow soap, unscented	2*d.* per lb.

It will be seen by the foregoing statement that the tariffs on perfumery in nearly all countries are in a confused state, and do not realise what should be the desire of the several Governments—that of raising an equitable revenue. The United States of America is perhaps one of the worst examples; how can they make perfumery, when they tax the raw material with which perfumery is manufactured with a heavy duty, from which France, Germany, and England are free? Again, the duty levied on manufactured perfumery entering the States, has considerably decreased the trade. What? decrease your general trade returns; build a tariff wall around your country, and so imitate the Chinese?

In order to assist readers studying the preceding tariffs, I append a foreign money table, and comparative French and English tables of weights and measures, for the use of those who purchase the products of the south of France.

FOREIGN MONEY TABLE.

The Gold Coins are marked thus (*) ; those in *Italics* are of Copper or other inferior metal.

The utility of giving this table in a Book on Perfumery has been more than once questioned; but the fact is, that quotations made by vendors and buyers are constantly made by dealers residing in other than English ports in the money or currency of the country hailed from.

Country	Coins	Sterling Value £	s.	d.
Austria	*Sovereign	1	7	10¼
„	*Imperial ducat	0	9	4½
„	Florin or ½ rixdaler of 60 *kreutzers*	0	2	0¾
„	Copfstuck of 20 *kreutzers*	0	0	8¼
„	*Ten-kreutzer piece*	0	0	4
Austrian Italy	*Pistole	0	15	8
„ „	Lira Austriaca of 100 *centesimi*	0	0	8¼
Brazil	*Moeda of 10,000 *reis*	1	2	5½
„	Milreis 1000 *reis*	0	2	0½
Bremen	Rixdollar of 72 *grotes*	0	3	3½
China, Birmah, Japan	Tael of 10 mace or 100 canderin or 1000 *cash*	0	6	6
Denmark	*Christian d'or	0	16	7¼
„	Rigsbank dollar of 96 *skill.*	0	2	2¼
E. Indies	*Mohur of Bengal	1	13	6¾
„	*Mohur of Bombay	1	10	1¾
„	*Rupee of Bombay	1	9	2½
„	*Rupee of Madras of 15 silver rupees	1	9	2½
„	*Star pagoda of Madras	0	7	4¾
„	Madras or Co.'s rupee of 16 annas or 192 pice	0	1	10¼
„	Sicca rupee: 16–15ths of Co's rupee	0	1	11¼
Egypt	*Sequin	0	5	4
„	Piast. or grouch of 40 *paras*	0	0	2¾
France and Belgium	*Napoleon of 20 francs	0	15	10¼
„ „	Franc of 100 *centimes*	0	0	9½
Germany, S.W.	*Imperial ducat	0	9	4½
„	*Ten-florin piece	0	16	11¼
„	Florin of 60 *kreutzers*	0	1	8
Great Britain	*Sovereign of 20 shillings	1	0	0
„	Shilling of 12 *pence*	0	0	11

Country	Coins	Sterling Value £	s.	d.
Greece	*Twenty-drachmai piece	0	14	2
„	Drachmi of 100 *lepti*	0	0	8½
Hamburg and Lubeck	Mark of 16 *schillings* or 192 *pfennings*	0	1	2¼
Hanover	Florin	0	2	10¾
Holland and Java	Florin or guilder of 20 stivers or 100 *cents*	0	1	8
Malta	*Louis	0	19	1
„	Pezza of 30 tari	0	4	3½
Naples	Ducat of 10 carlini	0	3	3¾
„	Carlini of 10 *grani*	0	0	4
Norway	Species dollar of 120 *skill.*	0	4	4¾
Peru	*Doubloon of 8 escudos	3	4	6¼
„	Piastre of 8 reals	0	4	2¾
Portugal	*Crown of 5000 *reis*	1	3	11¼
„	Milreis of 1000 *reis*	0	4	8½
„	Cruzado of 480 *reis*	0	2	3½
Prussia	*Frederick d'or	0	16	5¾
„	Thaler or dollar of 30 silver groschen	0	2	10¾
„	Five-silver groschen piece	0	0	5¾
„	Silver groschen	0	0	1
Rome	*Pistole	0	13	8½
„	*Sequin	0	9	4¼
„	Scudo of 10 paoli	0	4	2¾
Russia	*Imperial of 10 rubles	1	12	9
„	Ruble of 100 *copecs*	0	3	1¾
Sicily	*Oncia of 30 tari	0	10	10¾
„	Scudo of 12 tarins or 120 *grani*	0	3	11¾
Spain	*Pistole	0	16	2
„	*Doubloon of 100 reals	1	0	6
„	Hard dollar or piastre of 20 reals vellon	0	4	1¼
„	Real vellon	0	0	2¼
„	Plate dol. of 8 plate reals	0	3	1¼
„	Real of plate	0	0	4¾
Sweden	*Ducat	0	9	3½
„	Rixdaler of 48 *skillings*	0	4	5
Turkey	*Hundred piastre piece	0	18	0
„	Piastre of 40 *paras*	0	0	2
Tuscany	Lira Tosc. of 100 *centesimi*	0	0	8
„	Paolo	0	0	5¼
United States	*Eagle of 10 dollars	2	1	0½
„	Dollar of 100 *cents*	0	4	2¼

WEIGHTS AND MEASURES.

French Weights and Measures compared with English.

Litres	Imperial Gallons	Grammes	Troy Grains	Kilo-grammes	Lbs. Avoird.
1	0.22010	1	15.434	1	2.20486
2	0.44019	2	30.868	2	4.40971
3	0.66029	3	46.302	3	6.61457
4	0.88039	4	61.736	4	8.81943
5	1.10048	5	77.170	5	11.02426
6	1.32058	6	92.604	6	13.22914
7	1.54068	7	108.038	7	15.43400
8	1.76077	8	123.472	8	17.63886
9	1.98087	9	138.906	9	19.84371

English Weights and Measures compared with the French.

Imp. Gallons	Litres	Troy Grains	Grammes	Lbs. Avoird.	Kilogrammes
1	4.54346	1	0.06479	1	0.45354
2	9.08692	2	0.12958	2	0.90709
3	13.63038	3	0.19438	3	1.36063
4	18.17384	4	0.25917	4	1.81418
5	22.71730	5	0.32396	5	2.26772
6	27.26076	6	0.38875	6	2.72126
7	31.80422	7	0.45354	7	3.17481
8	36.34768	8	0.51834	8	3.62835
9	40.89114	9	0.58313	9	4.08190

The standard of Lineal Measure in France is the *Mètre.* 39.37100 English Inches make a Mètre.

1 Mètre in length is $1\frac{2}{5}$ Yards. 1 Square Mètre is very nearly 2 Square Yards.

1 Hectare is $2\frac{2}{5}$ Acres. 1 Hectare is 10,000 Mètres, or 19,600 Yards.

The standard of Square or Superficial Measure is the *Are.* 119.6046 Square Yards make an Are.

The standard of Cubic or Solid Measure is the *Stère.* 35.317 Solid Feet make a Stère.

APPENDIX

APPENDIX.

THE RASPBERRY JAM TREE, OR STINKING ACACIA (OF CENTRAL AND WESTERN AUSTRALIA), AND THE GUM WATTLE, OR FRAGRANT ACACIA (OF SOUTH AUSTRALIA).

By Louis Piesse, Calcutta.

IN my journey into Central Australia (starting from Adelaide), I noticed a species of Acacia growing in the dry, stony beds of some of the creeks (lat. 31° south, and long. 141° east), the blossom of which yielded such a putrescent odour, that it has received the name of the 'stinking Acacia.'

The leaves yielded no sensible smell when fresh; but having cut down a few small branches and placed them in the shade, I noticed that in forty-eight hours they gave out a strong, unpleasant odour, something like rotten cabbage. I had some branches in my tent in which the temperature varied from 100° to 110° Fahr.; and, as at the same time the air was intensely dry, it would appear that the odour is not easily eliminated.

A singular contrast was, however, exhibited in the wood, which, instead of partaking of the unpleasant smell of the blossoms or the leaves, was agreeably fragrant.

On my return to the settlements, I found that this species of Acacia, though unknown in South Australia, Melbourne, or New South Wales, was known in Western Australia as the 'Raspberry Jam Acacia,' from some supposed resemblance in the fragrance of the wood to the odour of that well-known preserve. The wood has obtained the colonial name of 'Raspberry Jam Wood;' and the specimens from Swan River were very superior in fragrance to those from Central Australia. It is of a dark colour, very similar in appearance to rosewood, very heavy, and sunk in water like a stone; and so hard when dry as to turn the edge of a saw or chisel.

The odour is probably due to the presence of a small portion of oil, as is the case with sandal-wood, only not so *rich-scented*, and it remains yet to be seen if it can be turned to profitable account by the perfumer. Let us suppose that essential oil of 'Raspberry Jam Wood,' or some other extract, could be obtained, it would not be a particularly pleasant perfume: but that does not militate against it: for the same may be said of musk, ambergris, and many others when pure.

The contrast between the odour of the blossom of the 'Raspberry Jam Acacia' and the blossom of the well-known Gum Wattle *Acacia decurrens* is very remarkable. The former is sickly and about as fragrant as an old cabbage stump; the latter is most agreeable and delicious—yes, it is most sweet! Many of the valleys to the south of Adelaide, every year as the season of blossoming returns, are redolent with the exquisite fragrance. This fragrance is, however, entirely in the blossoms, for the wood and leaves are scentless.

The Wattle, or fragrant Acacia, has been destroyed in nearly all the settled districts for the sake of the bark. That it might be profitably cultivated is beyond a doubt:—1st. It yields gall-berries of great utility in many branches of commerce. 2nd. A most valuable perfume. 3rd. A gum similar to Gum Arabic. 4th. The bark is much valued by the tanner. 5th. It might be cultivated on land which also could be used for pasturage. 6th. The seed might be turned to some account. The seed is in pods similar to peas. Cockatoos are very fond of them. I noticed flocks of the beautiful rose-breasted cockatoos feeding off the seeds of the 'Raspberry Jam Acacia' in Central Australia; and the white cockatoos in South Australia used to come in great numbers as regularly as the season, and gorge themselves with the seeds of the Gum Wattle. I used to vary my dinner—which, from there being no fresh meat to be had, was chiefly of salt pork—with a roast of these fellows; but I cannot say much in their favour, even with the recommendation of an Australian appetite.

The gum of the fragrant Acacia is used as an article of food by the aborigines. I have used it myself, and advised its use by others when hard pressed, and found it extremely nutritious. It requires some little cooking and bolting to get it down, for otherwise you may get as hungry while eating it as if eating walnuts. The natives would eat two or three pounds at a sitting.

The gum is the most valuable product, considered as an article of commerce. Some that I sent to England as a speculation realised 60*l.* per ton, and a portion 63*l.* per ton. The bark realised 15*l.* per ton. My agent, however, advised me that those prices could not be maintained. As the gum is four times the value of the bark, and is yielded annually, while the bark can only be obtained once (for the tree dies), it reminds one of

the fable of killing the goose. A party of men and boys out 'barking' would destroy a belt of Wattles a mile in length in a week; and they make no distinction as to whether they are growing on Crown or purchased land, so long as the owner is not located on it.

The gum is used by manufacturers to give an apparent thickness and superior quality to their goods; also by confectioners and many others. A wholesale stay-maker told me that it cost him 150*l.* per annum for Gum Arabic (which, after all, is chiefly obtained from Africa) merely to thicken and finish ladies' stays. The Australian savage eats the gum fresh and pure. Young England consumes it as a varnish or polish on his gingerbread and buns.

On a Means of detecting the Presence of Castor Oil in the Volatile Oils.

According to Mr. H. N. Draper, castor oil may be used to adulterate volatile oils, and if so used its presence could not be indicated by those means applicable to the detection of other fixed oils, on account of its solubility in alcohol. He has, therefore, devised a test for this oil, based on the production of œnanthylic acid. This body is a product of the oxidation of castor oil, and is formed when the warm oil is treated with an excess of nitric acid. A violent action ensues, during which much nitrous acid is disengaged; and there is found floating in the acid liquid, when the residue is mixed with water, a soft unctuous mass. If the acid liquid be neutralised with carbonate of soda, so as to entirely remove the odour of nitrous acid, the smell of the œnanthylic acid can be most clearly recognised. The mode of applying this test to the detection of castor oil in the volatile oils is as follows:—Twenty drops of the suspected oil are placed in a capsule, and heated on a sand-bath, until the odour of the oil is no longer perceived. To the residue—if there be any—add five or six drops of nitric acid, and as soon as the action has subsided, dilute with solution of carbonate of soda. If castor oil be present, the odour will be at once perceived, and, once smelled, is not likely to be mistaken for any other. The author states that 5 per cent. of castor oil in a volatile oil can be thus detected.

[Santal and cedar otto are commonly adulterated with castor oil. —S. P.]

Detection of Fusel Oil in Spirit of Wine.

Chloride of calcium, in small pieces, is put into a beaker, and just enough of the suspected spirit is poured over to moisten the whole; the beaker,

is then covered with a glass plate and allowed to stand. In a short time, if fusel oil be present, the smell will be distinctly perceptible, and will become stronger and stronger on standing for some hours. In this way the least trace of fusel oil can be recognised; but when the quantity present is very small, the mixture must be left together longer before the experimenter smells it, and then the nose must be applied frequently at short intervals.

The impossibility of recognising small quantities of fusel oil in spirit depends upon the insensibility of the olfactory nerves produced by the vapour of alcohol. If we wish to smell fusel oil alone, we must prevent alcohol vapour from rising; this is best done by mixing the alcohol with chloride of calcium, which fixes it. Fusel oil also combines with chloride of calcium; but the combination is not odourless, while the alcohol is held so fast that it does not disturb the smell of the fusel oil.

[It will be observed, in both the above cases, and in others quoted in this Appendix, that, after all, *the nose*, the olfactory nerve, is the true analyser.—S. P.]

Test for ascertaining the Presence of Alcohol in Essential Oils—Ottos.

J. J. Bernoulli recommends for this purpose acetate of potash. When to an ethereal oil, contaminated with alcohol, dry acetate of potash is added, this salt dissolves in the alcohol, and forms a solution from which the volatile oil separates. If the oil be free from alcohol, this salt remains dry therein.

Wittstein, who speaks highly of this test, has suggested the following method of applying it as the best:—In a dry test-tube, about half an inch in diameter, and five or six inches long, put not more than eight grains of powdered dry acetate of potash; then fill the tube two thirds full with the essential oil to be examined. The contents of the tube must be well stirred with a glass rod, taking care not to allow the salt to rise above the oil; afterwards set aside for a short time. If the salt be found at the bottom of the tube dry, it is evident that the oil contains no spirit. Oftentimes, instead of the dry salt, beneath the oil is found a clear syrupy fluid, which is a solution of the salt in the spirit with which the oil was mixed. When the oil contains only a little spirit, a small portion of the solid salt will be found under the syrupy solution. Many essential oils frequently contain a trace of water, which does not materially interfere with this test, because, although the acetate of potash becomes moist hereby, it still retains its pulverulent form.

Another process more simple and quite as trustworthy is the follow-

ing :—Into a graduated gauge pour a fixed quantity of the essence to be tested ; then pour in at least double the quantity of distilled water, and shake several times. Leave it to settle, and you will see whether the quantity of water at first poured into the gauge has diminished. The amount of the deficiency indicates the quantity of alcohol which was mixed with it.

A still more certain result may be obtained by distillation in a water-bath. All the essential oils, which have a higher boiling point than spirit, remain in the retort, whilst the spirit passes into the receiver with only a trace of the oil, where the alcohol may be recognised by the smell and taste. Should, however, a doubt exist, add to the distillate a little acetate of potash and strong sulphuric acid, and heat the mixture in a test-tube to the boiling point, when the characteristic odour of acetic ether will be manifest, if any alcohol be present.

The hydrocarbon essential oils, such as those yielded by all fruits of the family of the aurantiaceæ or hesperidaceæ, retain entirely the potassium and the sodium and lead. When mixed with spirit which contains oxygen, the metals are quickly tarnished and oxidised.

Detection of Spike Oil and Turpentine in Otto of Lavender.

By. Dr. J. Gastell.

There are two kinds of lavender oil known in commerce : one, which is very dear, and is obtained from the flowers of the *Lavandula vera* ; the other is much cheaper, and is prepared from the flowers of the *Lavandula Spica.* The latter is generally termed oil of spike. In the south of France, whether the oil be distilled from the flowers of the *Lavandula vera* or *Lavandula Spica*, it is named oil of lavender.

By the distillation of the whole plant, or only the stalk and the leaves, a small quantity of oil is obtained, which is rich in camphor, and is called oil of spike. Pure oil of lavender should have a specific gravity of from .876 to .880, and be completely soluble in five parts of alcohol of a specific gravity of .894. A greater specific gravity shows that it is mixed with oil of spike ; and a less solubility, that it contains oil of turpentine.

Detection of Poppy and other Drying Oils in Almond and Olive Oils.

It is known that the olein of the drying oils may be distinguished from the olein of those oils which remain greasy in the air, by the first not

being convertible into elaidic acid; consequently it does not become solid. Professor Wimmer has recently proposed a convenient method for the formation of elaidin, which is applicable for the purpose of detecting the adulteration of almond and olive oils with drying oils. He produces nitrous acid by treating iron filings in a glass bottle with nitric acid. The vapour of nitrous acid is conducted through a glass tube into water upon which the oil to be tested is placed. If the oil of almonds, or olives, contain only a small quantity of poppy oil, when thus treated, it is entirely converted into crystallised elaidin, whilst the poppy oil swims on the top in drops.

On the Colouring Principle of Volatile Oils.

By Septimus Piesse, F.C.S.

(Read before the Chemical Society.)

It is generally known that essential oils or ottos of plants have peculiar and characteristic colours: they are either 'yellow,' 'blue,' 'green,' 'brown,' or 'white,' *i.e.* colourless.

Having made some progress towards the discovery of the nature of the matters which impart these several colours, I now record the facts ascertained. The principal interest rests with the blue substance, which gives colour to the otto of 'camomile,' because this same body is present in other volatile oils, and imparts to them a green colour, being at the time under disguise by a yellow resin, which is also present in volatile oils of a green tint.

When blue otto of camomile is subjected to fractional distillation, the white hydrocarbon anthemidine is easily separated from the blue colouring, because the latter requires a much higher temperature to vaporise it than the former.

By the fractional distillation of otto of wormwood—absinthe—I obtain first a nearly colourless hydrocarbon; then, at the third fractioning, an oil having a brilliant green colour, which, at the fifth fractioning, divides into a blue oil, and a residuary yellow resin. When otto of 'patchouly' is obtained by distillation with water, the Indian herb pogostemon 'patchouly' is subjected to fractional distillation. I obtain in like manner first a colourless hydrocarbon; then, but not till the eleventh fractioning, a beautiful blue oil, and a brown yellow residue. The great number of fractionings required to separate the blue oil in this case is caused by the closer boiling points between the 'patchouly' hydrocarbon, the blue oil, and the resin, all of which are exceedingly high.

The otto of bergamot, from the rind of the fruit citrus bergamia, as

also otto of Ceylon lemon grass, andropogon schenanthus, yield, by the same treatment, small portions of this blue colouring.

By repeated rectification of the blue fluid, from whatever source derived, I at length render it free from extraneous matter, and in a state of purity; it then has a fixed boiling point of 576° F., its specific gravity 0.910. When boiled it produces a dense vapour of a blue colour, having special optical characters. I have named this substance *Azulene*, from azure, blue.

The analysis of azulene shows its formula to be :—

	Calculated	Found
C_{16}	82.05	81.21
H_{12}	11.12	10.95
O	6.83	7.84
	100.00	100.00

Or, $C_{16}H_{12} \times HO$.

The yellow colouring matter which imparts its tint to the several ottos appears to be an oxidised portion of the otto so stained. In nearly all instances ottos which are colourless when first obtained from their source become yellow by age, *i.e.* oxidation. This, however, is not universal, as the otto of nutmeg remains colourless for a lengthened period, even when air is drawn through it by an aspirator. The oxidised portion of the yellow coloured oils when separated from the pure otto in which it is dissolved are true resins; the majority of ottos oxidise during the act of distillation; hence, from this cause they vary in colour from pale yellow to red brown. When new—that is, freshly distilled—several essential oils are of a pale green tint, indicating the presence of azulene; but, as oxidation proceeds, the yellow resin generated conceals the azulene. We have—

A. Ottos which are colourless, containing neither azulene nor resin.

B. Ottos which are yellow, containing resin only.

C. Ottos which are blue, containing azulene only.

D. Ottos which are brown, green, and yellow-green, containing azulene and resin together in proportions varying as optically indicated.

It is remarkable how little azulene gives colour to an oil that contains no yellow resin; the otto of camomile is familiarised to us by its blue colour, but it does not contain 1 per cent. of azulene. Patchouly otto, which yields 6 per cent., and wormwood otto, which gives 3 per cent. of azulene, do not appear at all blue, owing to the presence of an excessive quantity of yellow resin. At the third fractioning of wormwood the yellow resin and the azulene are in due proportion to form a green solution; and such is probably the case with other ottos known for their green colour such as cajeput, but which I have not yet examined.

Practical Remarks on Spirit of Wine.

By Thomas Arnall.

The strength of spirit of wine is, by law, regulated by proof spirit (sp. gr. 920) as a standard; and accordingly as it is either stronger or weaker than the above, it is called so much per cent. above or below proof. The term *per cent.* is used in this instance in a rather peculiar sense. Thus, spirit of wine at 56 per cent. overproof, signifies that 100 gallons of it are equal to 156 gallons of proof spirit; while a spirit at 20 per cent. under proof, signifies that 100 gallons are equal to 80 gallons at proof. The rectified spirit of the Pharmacopœia is 56 per cent. overproof, and may be reduced to proof by strictly adhering to the directions there given—viz. to mix five measures with three of water. The result, however, will not be eight measures of proof spirit; in consequence of the *contraction* which ensues, there will be a deficiency of about ʒiv. in each gallon. This must be borne in mind in preparing tinctures.

During a long series of experiments on the preparation of ethers, it appeared a desideratum to find a ready method of ascertaining how much spirit of any density would be equal to one chemical equivalent of absolute alcohol. By a modification of a rule employed by the Excise, this question may be easily solved. The Excise rule is as follows:—

To reduce from any given strength to any required strength:—*Add* the *overproof* percentage *to* 100, *subtract* the *underproof* percentage *from* 100; multiply the result by the quantity of spirit, and divide the product by the number obtained by *adding* the *required* percentage overproof, or *subtracting* the *required* percentage underproof, to or from 100, as the case may be. The result will give the measure of the spirit at the strength required.

Thus, suppose you wished to reduce 10 gallons of spirit, at 54 overproof, down to proof, add 54 to 100 = 154; multiply by the quantity, 10 gallons (154 × 10) = 1540. The required strength being proof, of course there is nothing either to add to or take from 100; therefore, 1540 divided by 100 = 15.4 gallons at proof; showing that 10 gallons must be made to measure 15 gallons, 3 pints, 4 fl. oz., by the addition of water.

To ascertain what quantity of spirit of any given strength will contain one equivalent of absolute alcohol:—Add the overproof percentage of the given spirit to 100, as before; and with the number thus obtained divide 4062.184. The result gives in gallons the quantity equal to four equivalents (46 × 4).

Example.—How much spirit at 54 per cent. overproof is equal to 1 equivalent of absolute alcohol?

Here

$$54 + 100 = 154, \text{ and } \frac{4062.183}{154} = 26.3778 \text{ galls., or 26 galls. 3 pts.,}$$

which, divided by 4, gives 6 gallons, 4 pints, 15 oz.

Suppose the spirit to be 60 overproof,

$$\text{then } \frac{4062.183}{100 + 60} = 25.388 \text{ gallons } \left\{ \begin{array}{l} \text{one-fourth of which is equal to 6} \\ \text{gallons, 2 pints, 15}\tfrac{1}{2} \text{ oz.} \end{array} \right.$$

This rule is founded on the following data:—As a gallon of water weighs 10 lbs., it is obvious that the specific gravity of any liquid will give the weight of one gallon. The specific gravity of absolute alcohol is .793811; hence, the weight of 1 gallon will be 7.93811 lbs., and its strength is estimated at 75.25 overproof.

$$4 \text{ equivalents of alcohol} = 46 \times 4 = 184,$$

and

$$23.17936 \text{ gallons} \times 7.93811 \text{ lbs. per gallon, also} = 184.0003094.$$

Hence it appears that 23.17936 gallons of absolute alcohol are equal to 4 equivalents. By adding the overproof percentage (75.25) to 100, and multiplying by the quantity (23.17936 gallons), we get the constant number 4062.183.

The rule might have been calculated so as to show *at once* the equivalent, without dividing by 4; but it would have required several more places of decimals: it will give the required quantity to a fraction of a fluid drachm.

[These remarks are very useful, and are the kind of observations so well suited to practical men. To which I add that in speaking of alcohol or spirit, it appears necessary to explain the word 'proof,' as applied in England to a particular strength, a standard of quantity of absolute alcohol in a mixture of spirit and water. 'Proof' is a term used by the Excise for the purpose of levying the duty payable upon wine and other liquids which contain alcohol. The following is the specific gravity of various mixtures of alcohol and water:—

Specific Gravity.	
0.9200	= proof spirit.
0.9075	= 10 overproof.
0.8933	= 20.4 „
0.8646	= 40 „
0.8298	= 60 „
0.8156	= 67 „

0.8298 = 60 overproof is the strength used in perfumery.—G. W. S. P.]

Perfumes as Preventives of Mouldiness.

An interesting paper on this subject has been published by Dr. Macculloch. We presume our readers are aware that mouldiness is occasioned by the growth of minute vegetables. Ink, paste, leather, and seeds are the substances that most frequently suffer from it. The effect of cloves in preserving ink is well known; any of the essential oils answer equally well. Leather may be kept free from mould by the same substances. Thus Russian leather, which is perfumed with the tar of birch, never becomes mouldy; indeed, it prevents mould from occurring in other bodies. A few drops of any essential oil are sufficient also to keep books entirely free from it. For harness, oil of turpentine is recommended. Bookbinders, in general, employ alum for preserving their paste; but mould frequently forms on it. Shoemakers' resin is sometimes also used for the same purpose; but it is less effectual than oil of turpentine. The best preventives, however, are the essential oils, even in small quantity, as those of peppermint, anise, or cassia, by which paste may be kept almost any length of time; indeed, it has, in this way, been preserved for years. The paste recommended by Dr. Macculloch is made in the usual way, with flour, some brown sugar, and a litt'e corrosive sublimate; the sugar keeping it flexible when dry, and the sublimate preventing it from fermenting, and from being attacked by insects. After it is made, a few drops of any of the essential oils are added. Paste made in this way dries when exposed to the air, and may be used merely by wetting it. If required to be kept always ready for use, it ought to be put into covered pots. Seeds may also be preserved by the essential oils; and this is of great consequence, when they are to be sent to a distance. Of course moisture must be excluded as much as possible, as the oils or ottos prevent only the bad effects of mould.

Introduction of Hydrogen into Essential Oils. Change of one Otto into another.

Zinin (*Bulletin de St.-Pétersbourg*, T. iii. p. 529), and Kolbe (*Annal. der Chem. und Pharm.* Bd. cxviii. S. 122), have experimented on the direct addition of hydrogen to organic compounds. The latter digested a hot saturated solution of benzoic acid and a little hydrochloric acid with sodium amalgam, and in this way obtained bitter almond oil, another oil which becomes a crystalline solid on cooling, and a volatile acid. When the action takes place in an alkaline solution, the changes are different.

No bitter almond oil is obtained nor the crystalline oil; but more of the new acid is formed, which Kolbe intends to investigate further.

Zinin's former researches on benzile showed that it might be converted into benzoin by the direct addition of hydrogen. He now shows that, by continuing the action longer, new bodies may be formed containing more hydrogen than benzoin. The author made a boiling solution of one part benzoin and three or four parts alcohol of 75 per cent., and to this he added one part of strong alcohol, saturated with hydrochloric acid gas, and then half a part of finely-granulated zinc was slowly introduced into the mixture. As soon as the violent reaction ceased, another half a part of the alcoholic solution of hydrochloric acid gas was added, and the mixture boiled down to a half. It was then poured off from the undissolved zinc and mixed with water, whereupon an oily body separated, which soon cooled into a crystalline mass, which was purified by re-crystallisation from alcohol. It was then obtained in rhombic tables, which fused at 55°. This new body is more hydrogenated than benzoin; but the elementary analysis, the author says, presents unusual difficulties. By the action of nitric acid and of bromine on this new body, other crystallisable bodies are formed.

Bitter almond oil, dissolved in the alcoholic solution of hydrochloric acid and boiled with zinc, forms a thick oily body which sticks to the sides of the flask, and on cooling becomes solid and resinous. It is freely soluble in ether, and from the solution part crystallises out; the remainder separates as an oily mass, in which, after a time, other crystals form.

Artificial Preparation of Odours resembling the Fragrance of Certain Fruits.

Fusel Oil.

By W. Bastick.

This organic compound was first discovered by Scheele, as one of the distillation products of the wort obtained from the fermentation of potatoes. It has been subsequently examined by Pelletier, Dumas, Cahours, and others. It is generally now termed the hydrate of the oxide of amyl, from amyl being supposed to be its base or radical, as cyanogen is regarded to be the radical of another series of compounds.

It passes over towards the termination of the distillation process in a white turbid fluid, which consists of a watery and alcoholic solution of the fusel oil. The crude oil, consisting of about one half of its weight of alcohol and water, may be purified by being shaken with water and re-

distilled, with the previous addition of chloride of calcium. When the temperature of the contents of the retort reaches 296° Fahr., pure fusel oil distils over.

Fusel oil is a colourless oily fluid, which possesses at first not an unagreeable odour, but at last is very disgusting, producing oppression at the chest and exciting cough. It has a sharp, hot taste, and burns with a white-blue flame. It boils at 296° Fahr., and at a temperature of −4° Fahr. it becomes solid, and forms crystals. Its specific gravity at 59° Fahr. is 0.8124, and its formula $C_{10} H_{12} O_2$. On paper it produces a greasy stain, which disappears by heat, and when exposed to the action of the air it acquires an acid reaction. Fusel oil is slightly soluble in water, to which it imparts its odour; and soluble in all proportions in alcohol, ether, volatile, and fixed oils, and acetic acid. It dissolves phosphorus, sulphur, and iodine without any noticeable change, and also mixes with caustic soda and potash. It rapidly absorbs hydrochloric acid, with the disengagement of heat. When mixed with concentrated sulphuric acid, the mixture becomes of a violet-red colour, and bisulphate of amyloxide is formed. Nitric acid and chlorine decompose it. By its distillation with anhydrous phosphoric acid, a fluid, oily combination of hydrogen and carbon results. By oxidation with bichromate of potash and sulphuric acid, fusel oil yields valerianic acid, which is used in medicine, and apple-oil, employed as a flavouring ingredient in confectionery.

Valerianic acid is obtained by distillation from valerian root. It is a strong-smelling liquid, which forms with certain simple ethers compound ethers with variable odours. It is identical with the acid obtained by oxidation of the essence of potato (*amylic acid*), with the essence of the fruit of the Snow-ball (*Viburnum Opulus*), and with the essence of seal fat or *phocenic*. (O. REVEIL.)

ARTIFICIAL ESSENCE OF PINE-APPLE.

By W. Bastick.

THE above essence is, butyric ether more or less diluted with alcohol; to obtain which pure, on a large scale and economically, the following process is recommended :—

Dissolve 6 lbs. of sugar and half an ounce of tartaric acid in 26 lbs. of boiling water. Let the solution stand for several days; then add 8 ounces of putrid cheese broken up, 3 lbs. of skimmed and curdled sour milk, and 3 lbs. of levigated chalk. The mixture should be kept and stirred daily

in a warm place, at the temperature of about 92° Fahr., as long as gas is evolved, which is generally the case for five or six weeks.

The liquor thus obtained is mixed with an equal volume of cold water, and 8 lbs. of crystallised carbonate of soda, previously dissolved in water, added. It is then filtered from the precipitated carbonate of lime; and the filtrate is to be evaporated down to 10 lbs., then 5½ lbs. of sulphuric acid, previously diluted with an equal weight of water, are to be carefully added. The butyric acid, which separates on the surface of the liquid as a dark-coloured oil, is to be removed, and the rest of the liquid distilled; the distillate is now neutralised with carbonate of soda, and the butyric acid separated, as before, with sulphuric acid.

The whole of the crude acid is to be rectified with the addition of an ounce of sulphuric acid to every pound. The distillate is then saturated with fused chloride of calcium, and re-distilled. The product will be about 28 ounces of pure butyric acid. To prepare the butyric acid, or essence of pine-apple, from this acid, proceed as follows:—Mix, by weight, three parts of butyric acid with six parts of alcohol and two parts of sulphuric acid in a retort, and submit the whole, with a sufficient heat, to a gentle distillation, until the fluid which passes over ceases to emit a fruity odour. By treating the distillate with chloride of calcium, and by its re-distillation, the pure ether may be obtained.

The boiling point of butyric ether is 238° Fahr.; its specific gravity, 0.904; and its formula, $C_{12} H_{12} O_4$, or $C_4 H_5 O + C_8 H_7 O_3$.

Bensch's process, above described, for the production of butyric acid, affords a remarkable exemplification of the extraordinary transformations that organic bodies undergo in contact with ferment, or by catalytic action. When cane sugar is treated with tartaric acid, especially under the influence of heat, it is converted into grape sugar. This grape sugar, in the presence of decomposing nitrogenous substances, such as cheese, is transformed in the first instance into lactic acid, which combines with the lime of the chalk. The acid of the lactate of lime, thus produced, is by the further influence of the ferment changed into butyric acid. Hence, butyrate of lime is the final result of the catalytic action in the process we here have recommended.

The process for preparation of butyric acid given above is due to MM. Pelouze and Gelis. The commercial essence of pine-apple is prepared by dissolving one litre of butyric ether in eight or ten litres of alcohol at 18° or 55° centesimal.

Butyric acid is also obtainable by saponifying butter by means of a solution of potash, of a density of 1.12. The soap formed is to be dissolved in spirit, and distilled with an excess of sulphuric acid. The product is a mixture of butyric, capric, and caproic acids, in which the first predominates. It may be purified as above indicated.

Preparation of Artificial Essence of Quince.

By Dr. R. Wagner.

It has been believed, until the most recent period, that the peel of quinces contains œnanthylate of ethyloxide. New researches, however, have led to the supposition that the odorous principle of quinces is derived from the ether of pelargonic acid. A volatile oil, indeed, is found in quince peel, but in very small quantity, and is consequently very difficult to extract. In my last research on the action of nitric acid on oil of rue, I found that besides the fatty acids, which Gerhardt had already discovered, pelargonic acid is formed. This process may be advantageously employed for the preparation of crude pelargonate of ethyloxide, which, on account of its extremely agreeable odour, may be applied as a fruit essence equally with those prepared by Dobereiner, Hofmann, and Fehling. For the preparation of the liquid, which can be named the essence of quince, oil of rue is treated with double its quantity of very diluted nitric acid, and the mixture heated until it begins to boil. After some time two layers are to be observed in the liquid : the upper one is brownish, and the lower one consists of the products of the oxidation of oil of rue and the excess of nitric acid. The lower layer is freed from the greater part of its nitric acid by evaporation in a chloride of zinc bath. The white flocks frequently found in the acid liquid, which are probably fatty acids, are separated by filtration. The filtrate is mixed with spirits, and long digested in a gentle heat, by which a fluid is formed which has the agreeable odour of quince in the highest degree, and may be purified by distillation.—*Journal für praktische Chemie.*

Preparation of Rum-Ether and Essence of Strawberries.

Take of black oxide of manganese, of sulphuric acid, each twelve pounds ; of alcohol, twenty-six pounds ; of strong acetic acid, ten pounds. Mix and distil twelve pints. The ether, as above prepared, is an article of commerce in Austria, being the body to which rum owes its peculiar odour.—*Austrian Journal of Pharmacy.*

We have stated that the butyrate of pure ethyloxide possesses a delicate odour of pine-apple. By the addition of wine and potato spirits this odour may be modified, and converted into that of strawberry or raspberry. In a less pure state, and mixed with the ethers with accompany it when prepared from butter, *i.e.* the capric and caproic ethers, it may be employed for scenting the rum. Most rums of bad quality are prepared in this way.

SYNTHESIS OF OTTO OF RUE.

THE researches of Drs. Geisecke, Fittig, and Strecker bearing upon the constitution of the essential oil of rue (*Ruta graveolens*) as consisting of a mixture of ketons—viz. nonyl-methyl-keton, or caprinyl-methyluret—the authors describe, at great length, the experiments made by them for producing, synthetically, the oil alluded to by treating the fractional distillation products from a mixture of chemically pure caprinate and acetate of lime, so as to obtain caprinyl-methyluret which agreed, in all properties, with that found in natural oil of rue.

ARTIFICIAL ODOUR OF PEARS.

By M. Fehling.

THIS is an alcoholic solution of acetate of amyloxide, and acetate of ethyloxide. For its preparation, one pound of glacial acetic acid is added to an equal weight of fusel oil (which has been prepared by being washed with soda and water, and then distilled at a temperature between 254° and 284° Fahr.), and mixed with half a pound of sulphuric acid. The mixture is digested for some hours at a temperature of 254°, which means acetate of amyloxide separates, particularly on the addition of some water. The crude acetate of amyloxide obtained by separation, and by the distillation of the liquid to which the water has been added, is finally purified by being washed with soda and water. Fifteen parts of acetate of amyloxide are disolved with half a part of acetic ether in 100 or 120 parts of alcohol; this is the essence of pear, which, when employed to flavour sugar or syrup, to which a little citric or tartaric acid has been added, affords the flavour of bergamot pears, and a fruity, refreshing taste.

APPLE ESSENCE.

BY this name is designated an alcoholic solution of valerianate of oxide of amyl, or of potato essence. It is sometimes prepared simply by submitting to distillation crude potato oil in the presence of sulphuric acid and bichromate of potash. But at the same time is obtained a mixture of a little apple essence and a good deal of amylic alcohol. It is therefore better first to prepare the valerianic acid by the following method :—

Mix gradually one part of potato [fusel] oil with three parts of sulphuric acid and two parts of water; separately heat two parts and a half of bichromate of potash and four parts and a half of water; then mix the whole so as to keep up the boiling in the retort; the liquid distilled is

saturated with carbonate of soda, and the valerianate of soda is precipitated in crystals.

Take now one part by weight of potato [fusel] oil, mix it carefully with an equal weight of sulphuric acid, add one part and a half of perfectly dry valerianate of soda, and keep it at a gentle heat in the bain-marie. By adding water, the ether is separated. Purify it as in preceding cases. This valero-amylic ether mixed with five or six times its volume of alcohol constitutes the apple essence, the flavour of which is very pleasant.

Essence of Cognac and of Wine.

This name is applied to a mixture of various ethers of the ethylic series, the odour of which, however, is due chiefly to the pelargonic ether. There are two methods of preparing the essences. The first gives pelargonic ether almost pure; the second gives mixtures of very uncertain composition, and which appear to be of inferior quality. By the first method pelargonic acid is obtained by treating essence of rue with nitric acid, as we stated when speaking of essence of quince. To etherify pelargonic acid it is dissolved in concentrated spirit, and a current of dry hydrochloric acid is passed into the mixture. As the pelargonic ether is formed it rises to the surface.

By the second method fatty bodies are treated with nitric acid; fixed fatty acids are thus obtained, such as adipic, pimelic, lauric, succinic, &c., and some volatile acids which pass over on distillation, the principal being the butyric, valerianic, capric, and caproic, caprylic, œnanthylic, and pelargonic acids. It is this mixture which is etherised.

Sometimes spirit is scented with the product obtained by etherifying cocinic acid extracted from cocoa oil. To obtain this acid we purify the cocoa oil with potash, decompose the soap with hydrochloric acid, dissolve the acid obtained in spirit, and pass into it a current of dry hydrochloric acid. The liquid obtained is yellowish. Cleanse it in water and in alkaline water, and the product is pure cocinic ether. Mix with ten times its volume of alcohol.

How rich the essences of the shops are in pure essences may be estimated by distillation. The alcohol boils at between 80° and 85°, and the essences are left as a residuum.

Perfumery generally rejects artificial essences; it nevertheless sometimes makes use of essence of mirbane, and it may possibly succeed by-and-by in utilising other essences of agreeable odour, by taking the trouble to combine them or considerably dilute them. As sold in the shops they possess an odour which is very far from being pleasant; and besides, they have an injurious effect on the animal economy when inhaled in any large quantity. If they are employed it must be sparingly.*

Fruit Essences.

Fruit essences or artificial essences are alcoholic solutions of different ethers, of which the following are the formulæ :—

Pine-apple.

Chloroform	10 grammes
Aldehyde	10 „
Butyrate of ethyl	50 „
„ amyl	100 „
Glycerine	30 „
Alcohol at 100	1 litre

Strawberry.

Nitric ether	10 grammes
Acetate of amyl	50 „
Formiate of ethyl	10 „
Butyrate of ethyl	50 „
Salicylate of ethyl	10 „
Acetate of amyl	30 „
Butyrate of amyl	20 „
Glycerine	20 „
Alcohol at 100	1 litre

Raspberry.

Nitric ether	10 grammes
Aldehyde	10 „
Acetate of amyl	50 „
Formiate of ethyl	10 „
Benzoate of ethyl	10 „
Cold saturated alcoholic solution of tartaric acid	50 „
Glycerine	40 „
Alcohol at 100	1 litre

Apple.

Chloroform	10 grammes
Nitric ether	10 „
Aldehyde	20 „
Acetate of ethyl	10 „
Valerianate of amyl	100 „
Glycerine	40 „
Alcohol at 100	1 litre

Pear.

Nitric ether	50 grammes
Acetate of amyl	100 „
Glycerine	100 „
Alcohol at 100	1 litre

Apricot.

Chloroform	10 grammes
Butyrate of ethyl	100 „
Valerianate of ethyl	50 „
Salicylate of ethyl	20 „
Butyrate of amyl	10 „
Glycerine	40 „
Alcohol	1 litre

Fr. Chardin and Massignon.

On the Application of Organic Chemistry to Perfumery.

By Dr. A. W. Hofmann.

Cahours' excellent researches concerning the essential oil of *Gaultheria procumbens* (a North American plant of the natural order of the Ericinæ of Jussieu), which admits of so many applications in perfumery,[1] have opened a new field in this branch of industry. The introduction of this oil among compound ethers must necessarily direct the attention of perfumers[2] towards this important branch of compounds, the number of which is daily increasing by the labours of those who apply themselves to organic chemistry. The striking similarity of the smell of these ethers to that of *fruit* had not escaped the observation of chemistry; however, it was reserved to practical men to discover by which choice and combinations it might be possible to imitate the scent of peculiar fruits to such a nicety, that makes it probable that the scent of the fruit is owing to a natural combination identical to that produced by art; so much so, as to enable the chemist to produce from fruits the said combinations, provided he could have at his disposal a sufficient quantity to operate upon. The manufacture of artificial aromatic oils for the purpose of perfumery[3] is, of course, a recent branch of industry; nevertheless, it has already fallen into the hands of several distillers, who produce a sufficient quantity to supply the trade—a fact which has not escaped the observation of the Jury at the London Exhibition. In visiting the stalls of the English and French

[1] Qy. Confectionery? [2] Qy. Confectioners? [3] Qy. Confectionery?

confectioners at the Crystal Palace, we found a great variety of these chemical perfumes, the applications of which were at the same time practically illustrated by confectionery flavoured by them. However, as most of the samples of the oils sent to the Exhibition were but small, I was prevented, in many cases, from making an accurate analysis of them. The largest samples were those of a compound labelled 'pear oil,' which, by analysis, I discovered to be an alcoholic solution of pure acetate of amyloxide. Not having sufficient quantity to purify it for combustion, I dissolved it with potash, by which free fusel oil was separated, and determined the acetic acid in the form of a silver salt.

0.3080 gram. of silver salt=0.1997 gram. of silver.

The percentage of silver in acetate of silver is, according to

Theory	Experiment
64.68.	64.55

The acetate of amyloxide, which, according to the usual way of preparing it, represents one part sulphuric acid, one part fusel oil, and two parts acetate of potash, had a striking smell of fruit, but it acquired the pleasant flavour of the jargonelle pear only after having been diluted with six times its volume of spirit of wine.

Upon further inquiry, I learned that considerable quantities of this oil are manufactured by some distillers—from fifteen to twenty pounds weekly—and sold to confectioners, who employ it chiefly in flavouring pear-drops, which are nothing else but barley-sugar flavoured with this oil.

I found, besides the pear oil, also an *apple oil*, which, according to my analysis, is nothing but valerianate of amyloxide. Every one must recollect the insupportable smell of rotten apples which fills the laboratory whilst making valerianic acid. By operating upon this raw distillate produced with diluted potash, valerianic acid is removed and an ether remains behind, which, diluted in five or six times its volume of spirit of wine, is possessed of the most pleasant flavour of apples.

The essential oil[1] most abundant in the Exhibition was the pine-apple oil, which, as you well know, is nothing else but the butyrate of ethyloxide. Even in this combination, like in the former, the pleasant flavour or scent is only attained by diluting the ether with alcohol. The butyric ether, which is employed in Germany to flavour bad rum, is employed in England to flavour an acidulated drink called pine-apple ale. For this purpose they generally do not employ pure butyric acid, but a product obtained by saponification of butter, and subsequent distillation of the soap with

[1] The writer means *ether*!

concentrated sulphuric acid and alcohol; which product contains, besides the butyric ether, other ethers, but nevertheless can be used for flavouring spirits. The sample I analysed was purer, and appeared to have been made with pure butyric ether.

Decomposed with potash and changed into silver salt, it gave

0.4404 gram. of silver salt = 0.2437 gram. of silver.

The percentage of silver in the butyrate of silver is, according to

Theory	Experiment
55.38	55.33

Both English and French exhibitors have also sent samples of cognac oil and grape oil, which are employed to flavour the common sorts of brandy. As these samples were very small, I was prevented from making an accurate analysis. However, I am certain that the grape oil is a combination of amyl, diluted with much alcohol; since, when acted upon with concentrated sulphuric acid, and the oil freed from alcohol by washing it with water, it gave amylsulphuric acid, which was identified by the analysis of the salt of barytes.

1.2690 gram. of amylsulphate of barytes gave 0.5825 gram. of sulphate of barytes. This corresponds to 45.82 per cent. of sulphate of barytes.

Amylsulphate of barytes, crystallised with two equivalents of water, contains, according to the analysis of Cahours and Kekule, 45.95 per cent. of sulphate of barytes. It is curious to find here a body, which, on account of its noxious smell, is removed with great care from spirituous liquors, to be applied under a different form for the purpose of imparting to them a pleasant flavour.

I must needs here also mention the artificial oil of bitter almonds. When Mitscherlich, in the year 1834, discovered the nitrobenzol, he would not have dreamed that this product would be manufactured for the purpose of perfumery, and, after twenty years, appear in fine labelled samples at the London Exhibition.[1] It is true that, even at the time of the discovery of nitrobenzol, he pointed out the striking similarity of its smell to that of the oil of bitter almonds. However, at that time, the only known sources for obtaining this body were the compressed gases and the distillation of benzoic acid: consequently the enormity of its price banished any idea of employing benzol as a substitute for oil of bitter almonds. However, in the year 1845, I succeeded, by means of the anilin-reaction in ascertaining the existence of benzol in common coal-tar oil; and in the year 1849, C. B. Mansfield proved, by careful experiments, that benzol can be won without difficulty in great quantity from

[1] Of 1851.

coal-tar oil. In his essay, which contains many interesting details about the practical use of benzol, he speaks likewise of the possibility of soon obtaining the sweet-scented nitrobenzol in great quantity. The Exhibition [1] has proved that this observation has not been left unnoticed by the perfumers. Among French perfumeries we have found, under the name of artificial oil of bitter almonds, and under the still more poetical name of 'essence de mirbane,' several samples of essential oils, which are no more nor less than nitrobenzol. I was not able to obtain accurate details about the extent of this branch of manufacture, which seems to be of some importance. In London, this article is manufactured with success. The apparatus employed is that of Mansfield, which is very simple: it consists of a large glass worm, the upper extremity of which divides in two branches of tubes, which are provided with funnels. Through one of these funnels passes a stream of concentrated nitric acid; the other is destined as a receiver of benzol, which, for this purpose, requires not to be quite pure; at the angle from where the two tubes branch out, the two bodies meet together, and instantly the chemical combination takes place, which cools sufficiently by passing through the glass worm. The product is afterwards washed with water, and some diluted solution of carbonate of soda; it is then ready for use. Notwithstanding the great physical similarity between nitrobenzol and oil of bitter almonds, there is yet a slight *difference in smell which can be detected by an experienced nose.* However, nitrobenzol is very useful in scenting soap, and might be employed with great advantage by confectioners and cooks, particularly on account of its safety, being entirely free from prussic acid.

There were, besides the above, several other artificial oils; they all, however, were more or less complicated, and in so small quantities that it was impossible to ascertain their exact nature, and it was doubtful whether they had the same origin as the former.

The application of organic chemistry to perfumery is quite new; it is probable that the study of all the ethers or etherial combinations already known, and of those which the ingenuity of the chemist is daily discovering, will enlarge the sphere of their practical applications. The capryl-ethers, lately discovered by Bouis, are remarkable for their aromatic smells (the acetate of capryl-oxide is possessed of the most intense and pleasant smell), and they promise a large harvest to the manufacturers of perfumes.

[If the word '*flavour*' had been used by the various writers, who have written upon this subject, in the place of the word 'perfume,' and the

[1] Of 1851.

word '*ether*' in place of 'oil' and 'essential oil,' the dissemination of an erroneous idea would have been prevented: the word perfume, applied to pear oil, pine-apple oil, &c., implies, and the general tenor of the remarks of the writers leads the reader to infer, that these substances are used by perfumers, who not only do not, but cannot, use them in their trade, because these artificial essences, or ethers, when poured upon a handkerchief and held to the nose, act, as is well known, like chloroform, producing also most serious irritation of the air-pipes.

But for *flavouring* nectar, lozenges, sweetmeats, &c., these ethers, or oils, as the writers term them, are extensively used, and quite in accordance with assertions of Hofmann, Playfair, Fehling, and Bastick. However, the glorious achievements of modern chemistry have not lost anything by this misapplication of a trade term.—SEPTIMUS PIESSE.]

GAULTHERIA, OR WINTER GREEN.

MR. BASTICK remarks that the chemical history of this oil is one of great importance and interest, affording, as it does, one of the examples where the progress of modern chemistry has succeeded in producing artificially a complex organic body, previously only known as the result of vital force.

This volatile oil is obtained from the winter-green, an American shrub of the heath family, by distillation. When this plant is distilled, at first an oil passes over which consists of $C_{10}H_8$; but when the temperature reaches 464° Fahr., a pure oil distils into the receiver. Therefore, the essential oil of this plant, like many others, consists of two portions—one a hydro-carbon, and the other an oxygenated compound; this latter is the chief constituent of the oil, and that which is of so much chemical interest from the fact that it has been artificially prepared.

It is termed, when thus prepared, the spiroylate of the oxide of methyl, and is obtained when two parts of methylene, one and a half parts of spiroylic acid, and one part of sulphuric acid are distilled together. It is a colourless liquid, of an agreeable aromatic odour and taste; it dissolves slightly in water, but in all proportions in ether and alcohol; it boils between 411° and 435° Fahr., and has a specific gravity of 1·173. This compound expels carbonic acid from its combinations, and forms a series of salts, which contain one atom of base and one atom of spiroylate of the oxide of methyl. It behaves, therefore, as a conjugate acid. Its formula is $C_{14}H_5O_5 + C_2H_3O$.

The spiroylic acid may be separated from the natural oil by treating the latter with a concentrated solution of caustic potash at a temperature of 113° Fahr., when wood spirit is formed and evaporates, and the solution

contains the spiroylate of potash, from which, when decomposed with sulphuric acid, the spiroylic acid separates and subsides in the fluid.

Spiroylic acid is also formed by the oxidation of spiroyligenic acid, and when saligenin, salicin, courmacin, or indigo is heated with caustic potash.

Artificial Preparation of Oil of Cinnamon.

'Some years since Strecker showed that styrone, which is obtained when styracine is treated with potash, is the alcohol of cinnamic acid. Wolff has converted this alcohol, by oxidising agents, into cinnamic acid. The author has now proved that under the same conditions by which ordinary alcohol affords aldehyde, styrone affords the aldehyde of cinnamic acid; that is, oil of cinnamon. It is only necessary to moisten platinum black with styrone, and let it remain in the air some days, when by means of the bisulphate of potash the aldehyde double compound may be obtained in crystals, which should be washed in ether. By the addition of diluted sulphuric acid, the aldehyde of cinnamic acid is afterwards procured pure. These crystals also dissolve in nitric acid, and then form, after a few moments, crystals of the nitrate of the hydruret of cinnamyle. The conversion of styrone into the hydruret of cinnamyle by the action of the platinum black is shown by the following equation: $C_{18}H_{10}O_2 + 2O = C_{18}H_8O_2 + 2HO$.'—*Comptes Rendus.*

Flower Farms.—Premiums for Odours of Plants.

'The following premiums have been placed at the disposal of the Council of the Society for the encouragement of Arts, Manufactures, and Commerce, for the term of seven years, by Dr. Septimus Piesse, F.C.S.:—1. A premium of 5*l.*, for one pound of otto of bergamot, of the value of 16*s.* or more in the London market, being the produce of plants (*Citrus Bergamia*) grown in Australia, New Zealand, Natal, any of the British West India Islands, or any other British Colony or Dependency. 2. A premium of 5*l.*, for 1 oz. of otto of roses, of the value of 1*l.* or more in the London market, being the produce of any variety of roses grown together in one plantation in the above mentioned Colonies. 3. A premium of 10*l.*, for a canister of enflowered butter or fat, so scented with any kind or sort of flower, either by infusion or enfleurage, or by means of these processes jointly, of the weight of 3 lbs. or more, and of the value of 6*s.* per lb. in London; the said butter or fat to be enflowered or infused with flowers grown for the purpose in the British Colonies.'—*Pall Mall Gazette.*

Use of Fragrant Flowers.

Professor Tyndall states that the absorption of radiant heat by small quantities of perfumes, when diffused through common air, increases its power of arresting heat to an extraordinary degree; thus the absorptive power of air charged with the perfume of patchouly is 30 times greater than that of pure air; lavender increases the power to 60 times; and aniseed 372 times the natural amount: hence the perfume arising from a bed of flowers increases the temperature of the air around them by rendering it more absorptive of radiant solar heat.

Mercutio Frangipanni.

Morning breaks in golden splendour,
And the Heavens seem to smile
Lovingly upon the beauties
Of Antigua's purple isle.

From that island gentle breezes
Waft a fragrance o'er the deep—
The kisses of a thousand flowers
Stolen from them while asleep.

On the vessel's deck, the sailors
Gaze upon the fruitful slopes;
And in fancy shape the future
To their selfish dreams and hopes.

'See yon island,' cries the first one,
'It shall bring us wealth untold;
We will spoil it of its treasures;
We will rob it of its gold.

'We will toil and slave no longer
No more need there'll be to roam
For we'll lead the life of princes
When we reach our Spanish home.'

'Home!' exclaims another, laughing—
'Every place is home to me;
I will make a nest of comfort
In this island of the sea.

'Day by day the tawny natives
Shall to me their treasures bring;
Ingots heavy—precious jewels,
Fitting tribute to their king.'

Young MERCUTIO FRANGIPANNI
Joins not in these worldly dreams;
And as they speak, a shade of sadness
O'er his thoughtful forehead gleams.

'What is gold?' he cries with passion;
'Can it buy you joy or health;
Will ye never cease to barter
Peace and happiness for wealth?

'Look again—this lovely island
Teems with riches nobler yet
Than the glittering yellow metal
You would sell your souls to get.

'If I am to seize its treasures,
I will leave the Indian's gold
For those better gifts of nature
Which those Western climes unfold.

'See those birds of brilliant plumage,
See those incense-bearing trees;
What is all the gold of Ophir
To the precious wealth of these?

'Behold again, those lovely flowers
Jewelling the golden shores;
While a perfume rare and charming
From their chalice outpours.

'Oh! could I but catch that fragrance,
I would ask no other fame,
Than that those sweet-scented flowers
Should be coupled with my name.'

John Cargill Brough.

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SECTION XIV.

POMADES AND OILS.

Through jasmine bowers and violet-scented vales
On silken pinions flew the wanton gales,
Stealing their odours from the plants they left,
Then whispered to the woods their spicy theft.

ACCORDING to ancient writers, the words unguent, pomatum, ointment are synonymous titles for medicated and perfumed greases. Among Biblical interpreters, the significant word is mostly rendered 'ointment;' thus we have in Prov. xxvii. 9, 'Ointment and perfume rejoice the heart;' in Eccles. ix. 8, 'Let thy head lack no ointment.' 'The sons of the priests made the ointments of the spices' (1 Chron. ix. 30); 'Hezekiah was glad, and showed them his treasures, his spices, and the precious ointment' (Isa. xxxix. 2).

Oiling and greasing the hair is a custom pretty nearly universal among the people of all civilised nations. There are oil-glands on the scalp;[1] but their power of secretion is very slight, except in a few rare instances; in these cases the hair is said to be naturally 'moist' and soft. The general rule is, that the hair grows harsh and 'dry' for the lack of natural oily secretion; hence the instinctive application of an artificial oil—a practice hallowed by its ancient custom, and sanctioned as 'necessary,' from the Court beauty of St. James's, to the belle of equatorial Africa. M. Du Chaillu,

[1] Gazenave, *Traité des maladies du cuir chevelu*, Paris, 1850.

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